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News Picture Highlights . . .

KAMAN EXPLORER

New twin tailed Explorer, powered by 225 hp Lycoming carries three including pilot

BELL TRIES SKID GEAR

New type landing gear on Bell 47-D1 is especially useful in operating from soft terrain (Story on page 14.)

TWA 2-0-2A ROLLS OUT

Martin 2-0-2A with new insignia, that of TWA, rolled out of the factory June 13th to begin extensive tests before delivery in July.

METEOR NIGHT FIGHTER

Armstrong Whitworth will produce this two seat N.F. 11 all weather version of the Gloster Meteor powered by two Rolls Royce Derwent 8 turbojets of undisclosed power. The new Meteor's extended nose houses airborne interception radar.

CHASE YC-122C TAKES OFF

The newest model Chase YC-122C cargo transport takes off at a gross weight of 34,000 lb. Note new tail. Takeoff was made in about 700 ft., landing in about 600 ft. The all-metal YC-122C can be fitted with rato bottles to accelerate takeoff.

AVIATION CALENDAR

June 26-30—53rd annual meeting, American Society for Testing Materials, ninth exhibit of testing apparatus and related equipment, Chalfonte-Haddon Hall, Atlantic City, N J.

June 29-July 1—1950 national meeting of Institute of Navigation, San Diego, Calif

July 1-4—Ninth annual West Coast championship soaring contest, sponsored by Southern California Soaring Assn, El Mirage Field Adelanto, Calif

July 7-8—Royal Air Force 1950 display, Farnborough airfield, England

July 10-28—Air Age Institute lecture series, Parks Air College, E St Louis, Ill

July 12-14—Annual summer meeting of the Institute of Aeronautical Sciences western headquarters building, Los Angeles

July 14-16—National pilots air meet, including a national airplane trading day, sponsored by Chattanooga Flyers Club, Chattanooga.

July 16—Third efficiency race and air show, sponsored by Mansfield Aviation Club, Inc, Mansfield, O.

July 21-23—9th annual all-Ohio air tour, sponsored by Cleveland Junior Chamber of Commerce

Aug 2-13—17th National Soaring Contest, Grand Prairie, Texas.

Aug 7—Lions Club Air Meet, Sky Harbour Airport, Goderich, Ontario Canada

Aug. 7-18—Special two-week program on high temperature ceramics, Massachusetts Institute of Technology, Cambridge, Mass

Aug 7-20—First United States International Trade Fair Chicago

Aug. 19—Tennessee air progress conference, Knoxville

Aug 19-20—California Air Freight Clinic, sponsored by Calif Aeronautics Commission and Oakland Chamber of Commerce Aviation Committee, Oakland

Sept 2-4—National Air Races, Cleveland

Sept. 5-10—Eleventh flying display and exhibition, Society of British Aircraft Constructors Farnborough airfield, England

Sept. 7—Pratt & Whitney distributor operation and maintenance meeting, Pacific Airmotive Corp, Linden N J

Sept. 10-14—Instrument Society of America instrument conference and national exhibit, the Coliseum, Houston, Tex

Sept. 18-22—Fifth national instrument conference and exhibit, Memorial Auditorium, Buffalo, N Y

Sept. 28-30—14th annual convention of International Northwest Aviation Council, Sun Valley, Idaho

Oct 16-20—1950 annual general meeting of the International Air Transport Assn, Fairmont Hotel, San Francisco

Oct 26-27—5th annual aviation conference, sponsored by aviation committee of Tucson Chamber of Commerce

PICTURE CREDITS

7—Bell Aircraft, Glenn L. Martin Keystone Pictures Howard Levy; 16—Colonial Airlines.

NEWS DIGEST

DOMESTIC

First Lockheed F-94 was delivered to the Air Force's 319th All-Weather Squadron First all-weather jet fighter to go into service, the F-94 was developed from the F-80 which has now gone out of production after five years and more than 1700 delivered

Two Martin Mars flying boats carried a record 248 passengers and crew from Honolulu to San Diego. The Caroline Mars carried 144, and made the flight in 14 hr, 17 min The Hawaii Mars, which flew via Alameda, Calif, carried 104

Almon L. Beall, assistant to the chief engineer of Wright Aeronautical Corp, died last week at his home, Packanack Lake, N J. He was 60 years old With Wright since 1933, he was internationally recognized as an authority on fuels and lubricants

Airline pilots would be commemorated on an airmail stamp if the Air Line Pilots Assn is successful in persuading the Post Office Dept The department has just issued a stamp honoring American railroad engineers

Winners of Women's Air Races Betty Haas, Scarsdale, N Y., the annual Montreal-West Palm Beach derby (flying a Ryan Navion), Jean Parker and "Boots" Seymour, Arcadia, Calif, the annual transcontinental race from San Diego to Greenville, S C (flying a Taylorcraft)

First North American RB-45C four jet reconnaissance bomber has completed evalution tests and been accepted for delivery to the Strategic Air Command, Barksdale, La

Stephen F Lee, former director of public relations, USAF, has been awarded the Air Force Exceptional Service Award in recognition of "services responsible in a large measure for many achievements in the Air Force in its development as an effective force" Lee now is special assistant to Chairman W Stuart Symington of the National Security Resources Board

Last surcharges on "luxury" equipment operated by certificated domestic airlines are on the way out Reversing its previous decision (AVIATION WEEK June 12), CAB authorized Bramff, Delta, Eastern and National to cancel the 10 percent extra fares still in effect on DC-6s and Constellations

Another DC-6, its seventh, has been bought by Delta Air Lines Delivery is scheduled for next January Delta President C E Woolman said the plane is a revised model especially adaptable for conversion to turboprop engines which would increase cruising speed from 312 to 380 mph

Basic change in National Aeronautic Assn organization and policies is expected with revision of by-laws authorized by annual convention Directors were instructed to draft new by-laws to be approved by local chapters and put into effect by Oct 15 Present officers were re-elected to serve until new by-laws are in force

Personal aircraft exports in May of nine companies reporting to AIA totaled 34 planes of 5000 lb and under (empty airframe weight) valued at $106,685 In April, same companies shipped abroad 31 planes valued at $121,447 Israel was leading importer, with 14 planes valued at $31,171

FINANCIAL

North American Aviation, Inc declared dividend of 50 cents a share payable July 19 to stockholders of record June 28 This brings payments in the current fiscal year, which began Oct 1, 1949, to $1 25 per share

INTERNATIONAL

High subsonic speeds were reported from Argentina and France. In Argentina, the Rolls-Royce Nene-powered Pulqui II achieved 1000 km per hour (about 621 mph) in initial flight tests Its designer is Kurt Tank, former chief designer of Germany's Focke Wulfe Company In France, the SO-M2 research plane, powered by a Rolls-Royce Derwent V engine, attained 1000 km per hour in a shallow dive, the first time a French plane has achieved that speed

Two Air France crashes in the Persian Gulf off Bahrein Island killed a total of 84 Both planes were DC-4s, and both were en route to Paris from Indo-China In first crash, six of the 51 aboard were saved; in the second, 15 of 54 were saved

Federation Aeronautique Internationale elected Baron Amaury de La Grange, of France, president to succeed William R Enyart, of the U S, who was named honorary president

WHO'S WHERE

In the Front Office

Avery McBee has been appointed vp of Hill & Knowlton, Inc., public relations counsel He will handle program development for new clients Formerly public relations director for Glenn L Martin Co., he left there in 1946 to be manager of the Hawaiian office of N W Ayer & Son, advertising agency

Thomas H Quayle, formerly manager of the Turbodyne Corp., a Northrop subsidiary has been named director of associated products for the planemaker, and **A J Phelan**, formerly Turbodyne's vp-chief engineer is now president, general manager and chief engineer for the turbine concern Quayle will be in charge of processes, articles, and products developed by Northrop in parallel with the company's plane research and building programs

What They're Doing

Paul Gaynor, formerly with J M Hickerson Inc., left that firm to join Buchanan & Co another advertising agency Gaynor took the Fairchild E&A account with him

DARROW LAYS IT ON—Richard W Darrow Martin public relations and advertising head, handles a sticky job He's helping to post the first billboard plugging dedication of Friendship International Airport near Baltimore Darrow is chairman of the airport dedication committee

Honors and Elections

John F Victory, NACA exec secy has received honorary Doctor of Laws degree from Norwich University Vt On June 22, Victory observed his 35th year with NACA

Leroy R Grumman, chairman of Grumman Aircraft Engineering Corp received an honorary degree of Doctor of Engineering from Brooklyn Polytechnic Institute

INDUSTRY OBSERVER

► **A V Roe, Ltd**, is the instigator of a new movement in Canadian government and industry circles to bring the jet industry of that nation to a self-sustaining status. W N Deisher, Avro vice-president and general manager, stated such a program would be mandatory in an "emergency." He reported that the 7500-lb.-thrust Orenda jet engine is 85 percent Canadian built, the C-102 Jetliner, 80 percent, and the CF-100 jet fighter 90 percent Major loser, economically, would be Great Britain where component manufacture is now maintained.

► **Svenska Aeroplan AB**, Sweden, is negotiating with Fiat, Italy, in an effort to break Saab's production bottleneck Saab is still in the position of having a marketable DC-3 replacement transport with its 24/32-place Scandia 90 if production can be stepped up fast enough to get sales Alternative proposals offered are Fiat will build the Scandia on license if Italian government accepts plane as military transport. Otherwise Saab will order Scandia versions from Fiat as sales require

► **Curtiss-Wright Corp** has discontinued negotiations for the sale of the Victor Animatograph Corp., Davenport, Ia. The division was acquired by Curtiss-Wright in 1946 and will continue to be operated as a non-aviation subsidiary of the corporation Products are silent and sound motion picture equipment for private and industrial use.

► **Brazil** is getting set for the opening of preliminary negotiations for purchase of a substantial quantity of U S jet fighters Maj Gen Agalmar Mascarenhas, chief of staff, Brazil Air Force, following his recent visit to plants of U S manufacturers, is said to be pressing for purchase of Lockheed F-80 Shooting Star fighters

► **Installation of Sperry Zero readers** in North American F-95A turbojet fighters is expected to ease some of the multiple operational problems of the pilot of this one-man plane He must double as a radar operator to use the search radar installed in the nose of the fighter in addition to his other piloting jobs Summer delivery of Zero readers is scheduled

► **Sabena** is planning to buy two de Havilland Comet jet transports to be put into service first on South African routes to Johannesburg and Leopoldville

► **American Airlines** is embarking on a $1.25-million program to modernize the Pratt & Whitney R-2800s on its Convair-Liners, through purchase of kits with necessary replacement parts to make the engines the equivalent of the new R-2800-CB-16s which are rated at 2400 hp and have recently been certificated.

► **Deal** has been closed for sale to the Royal Canadian Air Force of 37 de Havilland Chipmunk tandem low wing all metal trainers for use by Canadian flying clubs in a new training program to supply 600 trained reserve pilots yearly to the RCAF Bonus of $100 has been offered by RCAF to each air force veteran chosen to undertake the work who completes 20 hr ground school and 20 flight hours

► **Four of the fastest British jets** are matched thus far in the Society of British Aircraft Constructors challenge cup race at Leeds, July 22 The latest Gloster Meteor, the de Havilland Vcoom, the Attacker I and a new Hawker jet fighter will compete over a 100 km closed circuit course Four of Britain's top jet test pilots will be at the controls

► **Fairchild Aircraft division's** experiments with track landing gears have led to development of a new endless-belt "runway" for use in testing landing gear, duplicating speed and resulting drag and shock conditions up to 160 mph

► **British flight safety researchers** are experimenting with an explosive means of opening an aircraft fuselage to rescue passengers in event of a crash. Device consists of a line charge, made in form of a tube. It contains the explosive in the center, like wire in a cable Line is designed to be held against side of the fuselage by a framework. It will be fired from a distance, and blast a rectangular shaped hole in the fuselage It is claimed the charge is light enough so that a person inside the fuselage leaning against the panel when charge was fired would not be seriously injured.

AVIATION WEEK

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AERIAL TRAILER TRUCK Fairchild's Pack Plane, may herald a more efficient and flexible military and commercial cargo plane.

Pod Plane—Solution to Cargo Problems?

Detachable fuselage promises revision of military and commercial freight handling.

Fairchild Engine & Airplane Corp. rolled out a revolutionary challenge to the transport manufacturing industry with its XC-120 Pack Plane in debut before high ranking Army, Navy and Air Force observers at Hagerstown, Md., last week.

Built under an Air Force experimental contract, the detachable-cargo-pod XC-120 is the first flying platform in the U. S. that melds the trailer truck principle with the airplane. To USAF and Army field forces officers the Pack Plane provides an entirely new concept of air transportation. In it they see the first practical answer to the most pressing of joint problems—logistical supply.

The XC-120 is a particularly significant example to the air transport manufacturing industry that development of an entirely new type aircraft design need not require high development and retooling costs.

The Fairchild plane has developed along lines that permit switch-over to the new design rapidly, economically and with little re training of personnel to new production technique. This system of development has long had the interest of military planners concerned not only with matters of budget, but with the problem of shaving excessively high hours of lead and flow time in new aircraft production.

(Grumman Aircraft is perhaps best known in military circles for strict adherence to a development policy of incorporating a high degree of previous planform, engineering technique and tooling into new aircraft design. This policy has lowered development costs and simultaneously increased the potential military acceptability of Grumman designs.)

▶**Resembles C-119**—In appearance, the XC-120 greatly resembles the standard production transport C-119. In fact, wing span of the XC-120—109 ft. 3 in.—is the same as that of the C-119. Length, however, is 82 ft. 10 in. This is 2 ft. 7 in. shorter than the C-119. Height is slightly less also, being 25 ft. 1 in. as compared to 26 ft. 6 in. of the C-119.

Main difference is that the fuselage is detachable from the remainder of the plane. The aerial platform for the pod, engines, cockpit, booms and tail surfaces is able to fly without the fuselage in the manner that a trailer truck may be driven minus its cargo van.

Chief advantage of the XC-120 is that it eliminates the vital factor of unload time in forward staging areas normally used by conventional aircraft in discharging their cargo. During Exercise Swarmer, a few weeks ago in the Carolinas, the joint Army-Air Force simulated problem of establishing and maintaining an airhead bogged down because of the unload time factor. Unloading times ranged from 45 minutes for the Douglas C-74 to about 25 minutes for the C-119 and C-82.

▶**Pod Detachable Quickly**—In the case of the XC-120, the pilot merely flys onto the airhead landing strip, detaches the pod in a matter of seconds, and is ready for takeoff to pick up another pod in a matter of minutes. Another advantage in this type of operation—of great interest to the military from point of economy as well as operation—is the fact that the reduced on the ground time in forward staging areas limits vulnerability of the aircraft damaged by the enemy.

On the ground and detached from the plane, the XC-120 pod may be unloaded at the convenience of its combat users instead of the plane commander. It also features both front and rear clam shell doors which open the entire cargo compartment for quick, direct loading or unloading in case of extreme emergencies.

The Cargo and Helicopter Section of USAF Aircraft Branch, demanding new transport design to meet changing needs of Air Force and Army cargo needs, has long been stumped by industry counter demands that they get more money for design and prototype development. Resulting stalemate, because of economy restrictions imposed by Defense Department and Congress, has retarded new cargo plane design development by major segments of the air industry.

The Fairchild C-82 and C-119, meanwhile, have won many converts to making the Army air transportable. The pod is ready for full scale use at touch down in any forward area.

Military planners are also considering other applications for the XC-120 pod. For example, huge life boats for air rescue service could be dropped by parachute in seas too rough for smaller airborne life boats. Landing barges filled with equipment for beachhead operations could be air dropped, as could shelters complete with food, heaters, etc., for Arctic rescue work.

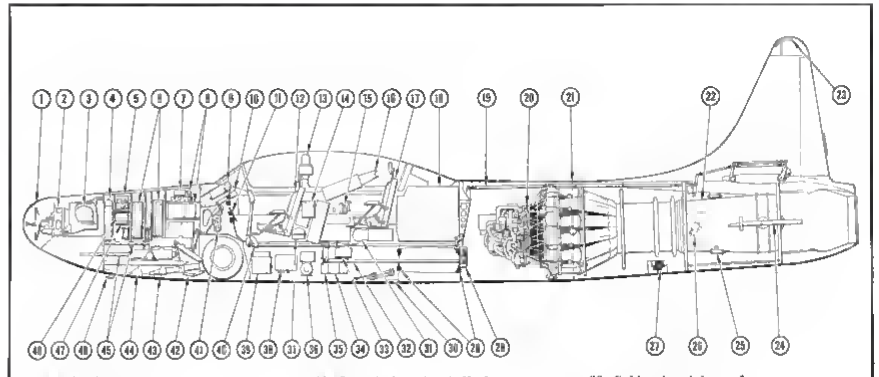
The XC-120 is powered by two Pratt & Whitney R-4360-20 engines developing 3250 hp. each and turning 181-in. Hamilton Standard propellers. Fuel capacity is 2798 gal., maximum speed at 18,000 ft. is 245 mph. Service ceiling is 23,700 ft., and rate of climb is 1100 fpm. Gross weight is 64,000 lb. and empty weight is 38,174 lb. Detachable cargo compartment has a 2700 cu. ft. capacity and can carry approximately 20,000 lb. of cargo. Plane carries a crew of five.

▶**Designed to Army Need**—Design wise, Army insisted that the pod be capable of being towed forward from the mother plane. As a result, a special quadricycle gear was developed. The plane itself rolls on four dual wheeled retractable main gears, two on either side. The pod also is equipped with four smaller dual-wheeled gears—two on either side—which permit the pod to be towed away after detachment. Pod wheels are removable for stowage in the fuselage.

Four ball and socket connections hold the pod to the mother plane. For raising and lowering the pod four electrical cable hoists, two on either side, are used. Rubber tubing seals the space where the pod and plane come together. Air pumped into the tube expands it to form an airtight connection.

▶**Modifications Planned**—Although Air Force has ordered but one XC-120, f airchild already has two modifications of the basic XC-120 designed and ready for engineering. These are the M-142 and M-144 detachable pod versions of the C-119. M-142 design configuration would use the same tricycle landing gear forward fuselage section, wings, engines, booms and tail as the C-119. Cargo section immediately aft of nose section would be cut away and a pod-type cargo compartment substituted.

The M-144 design basically is the



F-94A INNARDS REVEALED

CUTAWAY VIEW—One of the few released by Air Force since the end of the war—shows how designers crammed inside of Lockheed F-94A all-weather fighter with radar and other equipment to enable its crew of two to carry out its function of seeking and destroying enemy craft. Allison 6000 hp. 400-D9 engine gives this 15,000-lb. interceptor a speed of over 600 mph.

same as in the M-142 except that two Allison T-40-A-6 turboprop engines would be substituted for the two Pratt & Whitney 3500-hp engines powering the C-119. Additional turboprop power would permit a gross weight increase from 71,800 lb. of the C-119 to 77,000 lb. in the M-144, plus greater speed.

Escort Fighter Evaluation Begins

McDonnell F-88, Lockheed F-90, North American F-93 in Muroc competition. Prize: 150-300 plane order.

By Ben Lee

Three of USAF's fastest sweptwing jet fighters are scheduled to battle it out over Edwards AFB, Muroc, Calif., this week, as USAF begins an evaluation of escort fighters to determine which shall be ordered in quantity out of fiscal 1951 funds.

Planes involved in the competition are the McDonnell F-88, Lockheed F-90 and North American F-93. (Republic's YF-96A is still too new to appear in this competition, but is expected to be a contender in later evaluations of this type of craft.) Initial paper work and assignment of test personnel for the competition has been completed at Wright-Patterson AFB, Ohio.

Long range goal of USAF fighter development has been to produce a single type plane that can successfully perform all functions required of a modern fighter. This capability still remains a dream of fighter design engineers.

USAF fighter development had been split originally into three functional categories: Interceptor, all weather, and penetration. Highest priority was placed on development of interceptor types. But as development progressed, requirements, both from point of military necessity and budget economy, found interceptor and penetration types gradually pointing toward similar design objectives.

As a result, fighter development has been revised to two functional types: interceptor-escort and all-weather. Eventually, all USAF fighters will have to function as all-weather fighters. Improvements in navigation and radar bombing equipment have extended the scope of profitable bomber operations in bad weather and darkness on a scale undreamed of in World War II.

Requirements for interceptor-escort fighters are simple tactically but complex technically.

- **Rate of climb** USAF is shooting for is 50,000 ft. in less than five minutes.
- **Supersonic speed** requirements demand that fighters provide sufficient speed margin over high subsonic-speed long-range bombers now in operation. Today the speed advantage of present jet fighter equipment over jet bombers such as B-47 and B-45 is inadequate.
- **Missile armament** near sonic speeds of both fighter and bomber already flying have antiquated conventional machine gun equipment. Fighters being evaluated in competition next week at Muroc incorporate provisions for rockets and air-to-air guided missiles in place of machine gun armament.
- **Automatic control** of fighters is expected by USAF to be possible by 1955 through radio linkage with the automatic pilot. Such systems, partially developed already, relieve pilot of full responsibility for controlling the plane at particularly high speed. These are incorporated into the three fighters competing at Muroc.
- **Lighter metal** must be seriously considered for planes' construction because of atmospheric conditions encountered at extreme altitudes where the interceptor-escort fighter is called upon to give its best performance. Therefore, it is possible that considerable compromise with present standards of structural strength may occur. USAF is looking towards jet fighters of lighter weight, cheaper to produce in quantity and more economical in tactical operation.

The McDonnell Aircraft Corp. entry F-88 is powered by two Westinghouse J-34-WE-22 engines each rated at 3600 lb. thrust with afterburner. Fuel capacity is approximately 1400 gal. which gives the craft a 1725 mi. range. Maximum speed is approximately 730 mph, rate of climb 6000 fpm., service ceiling 40,000 ft. Gross weight is 27,000 lb., empty weight 12,000 lb., span, 39 ft. 8 in., length 54 ft. 1.4 in., height, 17 ft. 3.2 in.

The Lockheed Aircraft Corp. entry F-90 is powered by two Westinghouse J-46-WE-3 jet engines each rated at 6000 lb. thrust. Maximum speed is approximately Mach 1.5. Span is 40 ft., length 56 ft., and height 15 ft. Gross weight is 25,000 lb.

The needle-nosed F-90 features a wing with a thickness of only 8 percent of wing chord. This is the thinnest wing used on any but the Bell Supersonic X-1. Wing is swept back at 35 degrees and uses a heavy main spar with a huge forged fitting at the fuselage to handle torsion loads. Main fuel supply is located in the fuselage in kidney-shaped tanks around the engines. Fuel capacity with wing-tip tanks is about 1500 gal. Range as a result of wing-tip tanks is about 1700 mi.

North American Aviation Corp.'s entry, the F-93A is powered by one Pratt & Whitney J-48-P-6 jet engine which is rated at 5000 lb. thrust with afterburner. Maximum speed is rated at approximately Mach 1.7. Service ceiling is 50,000 ft., gross weight, 20,000 lb., empty weight, 12,000 lb. Span is 39 ft.; length 44 ft.; height, 16 ft.

The F-93 is considerably heavier than its earlier relative, the F-86 and features flush air intakes just above and forward of the wing roots in place of the single air intake of the F-86 in the center of the nose. Wing and tail surfaces are swept back approximately 35 degrees similar to those of the F-86. Wings are equipped with automatic slots and slotted type flaps. A single-wheel nose gear retracts forward into the nose while small diameter twin-wheeled main gear retracts into the wing roots.

The competition evaluation of all three fighters will last about three weeks.

During this time a complete shake-down test of each entry will be recorded for the decision by the Senior Air Board in Washington. The board is expected to recommend funds for purchase of from 150 to 300 escort fighters out of fiscal 1951 budget to the winner.

Metlbond

The article on Consolidated Vultee Aircraft Corp.'s use of Metlbond on page 20 of AVIATION WEEK June 19 ("Metlbond Saves Time, Money on B-36") was prepared by N. H. Simpson, chief chemist and D. A. Tooley, process design development engineer, of Convair's Ft. Worth division. AVIATION WEEK regrets that the authors' names were omitted.

Bell Ups Load, Cuts Price of 47D1

Bell Aircraft Corp. last week offered prospects an improved, more useful 178 hp. Model 47D1 helicopter at a lower price.

By substituting steel rail skids for the usual wheels (photo, page 7), Bell has added nearly 40 lb. to the copter's useful load (from 820 lb. to 859 lb.) and shaved the price from $23,500 to $21,950. And the skids says Bell, make "ideal" landing gear for snow, ice, ploughed fields or other uneven ground in addition to hard surfaces. Small wheels on the skids are cranked down for moving the copter on the ground.

The skids weigh less than one-half as much as conventional landing gear, according to Bell. It says they afford more stability on landing, and eliminate time and cost of maintaining wheels, tires and brakes.

Bell also announced a 200 hp. 47D1 which increases the useful load 20 per cent when installed on the skid copter. Useful load in this version is 989 lb. and maximum gross weight is 2350 lb. This is an increase in useful load of 312 lb. (or 46 percent) over the first Model 47B delivered in December, 1946.

The 200 hp. 47D1 is priced at $23,950, and shows the following performance at maximum gross weight: maximum cruise speed, 96 mph.; climb, 875 fpm.; service ceiling, 11,300 ft.

New Tow Target Aids Jet Gunnery

A high-speed, winged tow target, the X27A, is in quantity production at Chance Vought Aircraft, Dallas. Cheaper than radio-controlled drones and more realistic than fabric sleeves, the X27A is intended for gunnery practice with jet aircraft. It has been towed behind the North American B-45 at better than 450 mph. (sleeve targets are limited to less than 300 mph.) and at an altitude of 35,000 ft.

The target aircraft is 19 ft. long, has a 24-ft. wingspan, and V-shaped nose and tail control surfaces. Construction is all-metal for good radar reflection and is kept simple for ease of repair and maintenance.

C-W Leads Air Force May Contracts

Curtiss-Wright Corp. divisions got one-quarter of the $24 million Air Force contracts over $100,000 awarded in May. The propeller division got $4,658,783 for propeller assemblies and parts for B-36 and C-121 aircraft; Wright Aeronautical Corp. was awarded a $1 million contract for engine conversion work, and the airplane division got a quarter million dollar contract for overhaul of power units. Details follow:

Aerojet Engineering Corp., Azusa, Calif.: study of rocket fire protection and fire control in case of accidental ignition, Apr. 24, $120,560.

American Gas Accumulator Co., Elizabeth, N. J.: cable adapter plug assembly and receptacle assembly, May 4, $109,008.

American Pad & Textile Co., Greenfield, O.: L-2 flight jackets, May 26, $259,660.

American Phenolic Corp., Chicago: transmission lines and connectors, Mar. 31, $103,336.

Apple, W. A. Textile Mfg. Co., Dayton: parachute harness assembly, May 25, $301,530.

Bendix Products div., Bendix Aviation Corp., South Bend, Ind.: carburetor spare parts, Apr. 25, $494,446; carburetor spare parts and fuel system spare parts, Apr. 26, $757,082.

Bendix Radio Div., Bendix Aviation Corp., Baltimore: components for radio compass AN/ARN-6, Apr. 27, $105,347.

Boeing Airplane Co., Seattle: producibility study on B-47 type airplanes, Apr. 24, $561,514.

Bristol Mfg. Co., Bristol, R. I.: shoe, Miklul, heavy flying type N-1, May 8, $106,425.

Cappel, McDonald & Co., Dayton: emergency sustenance kit, May 5, $151,172.

Curtiss-Wright Propeller div., Curtiss-Wright Corp., Caldwell, N. J.: installation and spare propeller assemblies, controls, spare blade assemblies and spare parts for B-36 airplanes, Apr. 4, $4,383,623, 22 propeller assembly and 22 slip ring housing assembly for support of C-121 aircraft, Mar. 14, $275,160.

Curtiss-Wright Airplane div., Curtiss-Wright Corp., Columbus, O.: overhaul of auxiliary power units type V32-D2, May 26, $250,000.

"Denison Engineering Co.," Columbus, O.: Hydraulic test stand and maintenance data, engineering data and export packing, Apr. 7, $476,097.

Eclipse Pioneer div., Bendix Aviation Corp., Teterboro, N. J.: indicator, Type J-8, altitude gyro, Apr. 27, $2,244,552; starter assembly EP type 1416-51-G EP 1416-42-G direct cranking, May 11, $187,698.

Edo Corporation, College Point, N. Y.: float and strut assemblies for L-5 and C-45 aircraft, Apr. 27, $203,745.

Eicor, Inc., Chicago: modification of alternators and exciters, May 12, $155,200.

Fairchild Camera and Instrument Corp., Jamaica, N. Y.: echo box TS-488/UP, May 17, $238,484.

Foster, L. W., Sportswear Co., Philadelphia: flying suits, May 26, $448,200.

Goodrich, B. F., Akron: wheels and brakes, Apr. 11, $199,651.

Goodyear Tire & Rubber Co., Akron, wheels and brakes, May 1, $126,997.

Harnischfeger Corp., Milwaukee, 3 overhead cranes, Apr. 6, $124,243.

Janke & Co., Hackensack, N. J., aircraft engine test prefabricated type, May 4, $138,448.

Kollsman Instrument div., Square D Co., Elmhurst, N. Y.: Type F-5 air speed indicator, May 19, $125,937.

Lewyt Corp., Brooklyn: signal generators TS-452/T, May 17, $262,642.

Lockheed Aircraft Service, Inc., Ontario, Calif.: services and materials necessary to rehabilitate (100) F-51 type aircraft, May 26, $500,000.

McColpin Christie Corp., Ltd., Los Angeles: rectifier power supply station assembly, Apr. 26, $193,065.

McPhillips & Co., Trenton, N. J.: pack assembly, pack tray, May 9, $125,416.

Morse Instrument Co., Hudson, O.: processing machine, May 17, $218,647.

New York Rubber Corp., New York: pneumatic mattresses, May 11, $589,920.

North American Aviation, Inc., Los Angeles: fuel tanks, May 8, $376,068.

Photostat Corp., Rochester, N. Y.: photocopying machine, May 24, $207,777.

Schwien Engineering Co., Los Angeles: Type F-1 automatic ripcord parachute release, Apr. 28, $359,049.

Sheldon Machine Co., Chicago: cone headscrew cutting bench type lathes, May 19, $138,601.

Shepard Elevator Co., Cincinnati: design, furnish and install adjustable orifice diaphragm, May 9, $194,723.

Sperry Gyroscope Co. div., Sperry Corp., Great Neck, N. Y.: E-4 automatic pilot, May 5, $473,842.

M. Steinthal & Co., New York: riser jettisonable canopy, May 1, $261,600.

Sundstrand Machine Tool Co., Rockford, Ill.: Type F-1A constant speed alternator drive and spare parts, May 10, $2,019,343.

Switlik Parachute Co., Trenton, N. J.: harness assembly (back style and seat type) jettisonable, May 1, $1,029,100; cover panel, May 9, $206,400.

Technicraft Corp., Kansas City, Mo.: multimeter TS-352/U, May 23, $108,000.

Texas Engineering and Manufacturing Co., Dallas: B-3 oxygen servicing trailer, May 29, $231,408; maintenance inspection on (60) C-54 aircraft, May 24, $1,655,119.

United Mfg. Co., New Haven, Conn.: stand, test aircraft generator, maintenance and engineering data, May 8, $318,239.

Westinghouse Electric Corp., Dayton: relays, May 18, $154,515.

Wolverine Diesel Power Co., Detroit: Type B-6B powerplants, May 4, $284,253.

Wright Aeronautical Corp., Wood Ridge, N. J.: conversion and modernization of R-3350-23A engines to R-3350-57 AM engines, May 1, $1,000,000.

Yoh, H. L. Co., Inc., Philadelphia, development of air compressor, May 19, $105,788.

Lockheed Plant

$5-million construction program includes new heavy machinery.

Lockheed Aircraft is betting $5 million that booming aircraft manufacturing is going to get even bigger.

The money is going into a factory expansion program, already partially completed. The new production setup will enable the Burbank plane maker to use the latest techniques in forming and processing heavier, tougher materials, such as 75ST aluminum and stainless steel, to meet the greater stress requirements of high-speed aircraft. And it will mean the company can handle tighter production schedules and up its output rapidly in event of emergency.

A 33,000 sq ft factory building ($466,000) will house giant machinery, including an 8000-ton Birdsboro hydraulic press ($750,000) towering 35 ft above the floor and with its base 12 ft in the building's foundation. Because of size, all the heavy equipment is being erected in the open and the building will be put up around it.

Some other recent Lockheed additions include a 200 ton Hufford metal stretching press ($318,000), horizontal Hydrotel automatic milling machine ($138,000), 20 ton Ceco pneumatic stamp hammer ($103,000), new boiler ($178,000), automotive and materials handling equipment ($133,000), and portable and standard tools $231,000).

In addition to the three new forming machines, the new building will also be fitted with a top riding, undershung crane, the milling machine, a large boring mill, a heat-treat oven, and the necessary handling equipment.

The new machinery will enable Lockheed to build planes having larger and stronger components, thus reducing man hours, paper work, inspections, and storage and handling facilities for countless small parts and assemblies.

Forming and processing of half inch-thick aluminum alloy sheets 30x10 ft—a 243 percent increase over previous maximum sheet size—will be possible.

▶ **Lowered Prices**—Lockheed has already made progress in cutting manufacturing costs. Here are some examples:

• **The 200th Constellation,** being delivered this summer, is taking one third the man-hours expended on the 100th Connie delivered about three years ago.

• **F-80s** delivered now have airframe costs slashed to one sixteenth the cost of the prototypes and five-eighths the cost of the planes turned out in the initial large order. The F-80 is going out of production this summer.

• **Cost of P2V Neptunes** is now less than one fifth the cost of the original production order four years ago.

Grumman Sub-Killer Wins Navy Approval

Grumman Aircraft Engineering Corp. last week won the Navy's design competition for a new twin-engine carrier-based antisubmarine search and attack plane. Contract for two experimental prototypes of the new plane are now being negotiated.

Developed as a larger and longer range successor to Grumman's AF-2 single-engine sub-killer plane, the new model will weigh approximately 21,000 lb. gross and will be powered with two Wright R-1820 engines rated at 1275 hp. each. Presumably the new plane may be designated XAF-3, or XA3F if it follows the new style Navy designation given to the Douglas A2D turboprop attack plane.

The new sub-killer plane specification called for relatively short landing and takeoff characteristics for operation from small escort aircraft carriers, and the newest radar detection equipment and counter-weapons.

Weekly Notice Will Give Award Data

Beginning July 15, names of contractors awarded Army, Navy and Air Force contracts of $25,000 and over will be made available on a weekly basis through Department of Commerce field offices and all other outlets for procurement information.

Under the new plan each of the military departments will prepare a weekly synopsis of awards on unclassified, negotiated and formally advertised contracts amounting to $25,000 or more. The synopses will also contain the items to be purchased and the approximate value of each award.

Each week the synopses will be consolidated and distributed to more than 1200 information outlets throughout the U. S. and Hawaii, by the Commerce Department.

TURNING OUT AERIAL TANKERS

This dual modification line at Boeing's Renton plant is busy converting B-29s into flying tankers for aerial refueling missions. The line is set up to handle ten B-29s at a time. The Boeing-developed fueling booms are made at Seattle in Plants 1 and 2 and trucked to Renton for installation. The company has a contract for an undisclosed but "substantial" number of aerial refueling systems and their installation. Several B-29 tankers are now being flight-tested under designation KB-29P.

PRODUCTION BRIEFING

▶ **Consolidated Vultee Aircraft Corp.** has acquired exclusive rights to the Charactron tube invented by Joseph P. McNaney of the company's engineering staff. The tube can be used for visual message presentation in aircraft, ultra-high-speed transmission of signals, messages and data, and high-speed printing in connection with computers. Convair plans to begin an aggressive development program on the device.

▶ **Boeing Airplane Co.** has distributed $500,000 to officers and employes under its incentive distribution plan. The outlay was based on company earnings for 1949. The plan is understood to be limited largely, if not completely, to supervisory personnel. Last year Boeing handed out $160,000 to more than 1300 officers and employes.

EDO PLANT (left) today—seaplane slip at the left. Float production (right), under full swing at College Point factory.

Edo's Electronic Efforts Pay Off

Newly-formed division accounts for a large proportion of business as float development continues.

Four years ago the Edo Corp. departed from its tradition of float manufacturing and specialized aircraft sheet metal fabrication to launch an electronic program.

Results prove it was a smart decision.

Today, the number of electronic item contracts equals all others on Edo's books, while the dollar value of these contracts represents some 80 percent of the company's total business.

▶ **Airborne Unit**—Sonar is the principal brain child of the electronics division, under Noel B. McLean, executive vice president. W. R. Ryan, vice president engineering A. M. Brown, Jr., vice president-sales and S. Levine, assistant chief engineer-electronics. McLean, who came to Edo from Bendix, brought with him Ryan and Levine who had been responsible for the development of a new and revolutionary recording depth sounder which has led to Edo's interest and work in the sonar field.

Edo's background and experience in the aeronautical field have aided immeasurably in the reduction of weight and miniaturization of shipborne sonar equipment for airborne application.

▶ **Early Days**—The Edo Corp. was founded 25 years ago by Earl D. Osborn, whose initials gave the company its name. The original factory, still in use, was erected on a bayside plot in College Point, L. I., adjacent to a yacht club and a beer garden.

First project of the Edo Aircraft Corp., as it was then called, was a 100 hp. all metal flying boat called the "Malolo." Soon perceiving the limited market for flying boats, Osborn conceived the idea of developing floats with which any land plane could be converted to a seaplane with a minimum expenditure of time and money.

Within a year, Edo had produced its first pair of all metal, scow-shaped twin floats. They were installed on a Waco 9 of the Ludington Exhibition Co. of Philadelphia. Edo soon introduced the fluted bottom to float design, resulting in greatly improved hydrodynamic performance over previously available wooden floats. Float production had begun in a modest way.

By 1929, Edo had developed a series of standardized floats for aircraft ranging from 1500 to 8000 lb., both military and commercial.

▶ **Wartime Growth**—During the war, Edo underwent a terrific expansion, both in personnel and endeavor, culminating in the production of a Navy float plane of its own design, the Edo XOSE-1. The craft mounted a 550-hp. engine and was intended primarily for scouting.

The postwar period was characterized by a trend towards diversification. Realizing the expanding requirements of the armed forces, Edo vigorously developed a three point program.

• **Electronics Division.** As a corollary to the sonar development, Edo also is producing the Contour Bottom Scanner (CBS) which shows the shape of the bottom below and to either side of a ship.

• **Aircraft Activity.** While the major effort in this phase was float design and production, Edo, capitalizing on its ability to produce specialized aluminum parts, also manufactured and still produces large quantities of propeller spinners, radar nacelles, and reflectors and jet engine stands and crates.

The latter represented an interesting approach to the problem of protecting relatively delicate jet engines for shipment (AVIATION WEEK Oct. 25, 1948). Edo applied the principle of elastic packaging, building an aluminum shipping container capable of considerable distortion before breaking. This was able to absorb much of any given shock without passing it along to the engine. For example a 47G impact outside of the container was reduced to a 7G load on the engine itself.

• **Marine Development.** Products of this division are the USAF-type A-3 airborne lifeboat, an aluminum Arctic cargo launch and skiff.

The A-3 project was undertaken for the USAF and resulted in the production of an aluminum life boat nearly 30 ft. long capable of being carried under a B-29 and dropped by a parachute 100 ft. in diameter (AVIATION WEEK Aug. 16, 1948). The boat is powered by a four cylinder engine, can carry 15 men and has a range of 500 miles. Equipment aboard includes dry clothes, rations, a still for making drinking water, a food warmer, cockpit heaters and tarpaulins for protection against rain and cold.

The cargo launch, developed for the Army Transportation Board, is 32 ft long and is built in three easily assembled sections that can be carried by air

► **Security in Diversity**—From this diversification of effort, Edo derives security, and although 96 percent of its business is with the goverooment, the number of branches which it serves tends to insure stability

Osborn, founder of the company (which is privately owned), is still its president and board chairman He has directed its course from the time when it employed only a handful of employes and earned a negligible profit.

Today its employment has stabilized at about 400 (of whom more than 85 are engineers) and sales are in the $3 to $4-million bracket

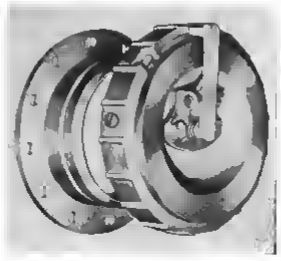
Osborn has been an aviation enthusiast all his life, learning to fly some 25 years ago He owns a float equipped Luscombe 170, which he flies from a slip at the plant almost every day the weather permits

His astuteness as a businessman is underlined by the fact that, although many competitors have come and gone, Edo has maintained itself as the world's foremost and successful float manufacturer (at least on this side of the Iron Curtam), ever since its inception

Osborn told AVIATION WEEK that Edo floats won and kept their reputation because of their hydrodynamic superiority, ruggedness and durability At least one set is known to have been in continuous use for 18 years

► **Twin Floats**—Edo's development of twin floats for land planes has had its impact on the exploitation of many countries, primarily Canada A top Canadian official stated not long ago that the twin float plane was indisputably responsible for opening up vast portions of northern Canada which otherwise would have been inaccessible because of the impenetrable muskeg and swampland (The twin float configuration is seen by Edo as the only practical installation for land planes where wings are not built to withstand stresses imposed by wing tip floats required for a single pontoon installation.)

Edo is still devoting considerable engineering effort to improve float design by increasing efficiency and reducing cost and weight It is looking forward to the day when a small turbojet plane will be built which packs enough power to make a twin float amphibian feasible The market for such an aircraft, Edo officials feel, would be immense



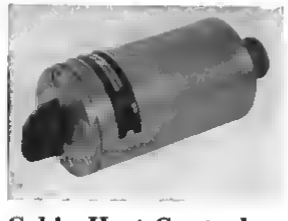
Fuel Tank Cap

Safety Cap for pressurized fuel tanks in aircraft is quick-disconnect type which does not require the use of tools When locking lever is lifted to allow removal of cap, it also actuates integral valve which relieves tank pressure. Designated No 2654-40, cap is made by **Roylyn, Inc**, 718 W Wilson Ave, Glendale 3, Calif

Added safety is provided when fuel tank access door is made to interfere with lever in unlocked position With this arrangement, access door cannot be fastened until cap is properly locked with lever in horizontal position

Unit gives 3½ in clear opening for fuel loading and weighs 1¾ lb With dural nipple it can be used for working pressures up to 50 psi; steel nipple makes it suitable for 100 psi pressures

Cap gives positive seal through temperature range of —65 to 350 F Adapters (necks) of various heights and bolt circles are available



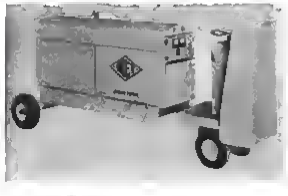
Cabin Heat Control

Rheostat for cabin temperature regulation, made by **Barber-Colman Co**, Rockford, Ill, combines control point selection for automatic heater or bypass valves and manual over-ride

Control point for automatic valve operation is set on a graduated dial In case of automatic control failure, valves and other units can be manually positioned by detent action switches at end of rheostat travel Rheostat setting is maintained by friction brake

Single or tandem units are available with maximum resistance of 3000 ohms 180 deg travel

NEW PRODUCTS DIGEST



Kit Makes Power Units Self-Propelled

A newly developed conversion kit to make tractor-drawn ground power equipment self-propelled has been put on the market by **Industrial Electronics & Transformer Co.**, 8655 South Main St, Los Angeles 3, Calif, makers of INET aircraft ground power units

Conversion, which normally takes four hours, consists of removing two wheels from existing unit, welding the completely assembled kit in place and connecting wires from the generator to the electric drive motor.

Specifications

• **Drive:** Completely enclosed 28v motor drives front (steering) wheels through a differential Turning radius is nearly 90 degrees

• **Speed:** Three speeds forward and reverse, top speed approximately 6 mph

• **Brakes:** Hydraulic brakes, "dead man" type which set automatically when operator's foot is lifted. Thus parking brakes are automatic and machine will come to a halt should operator fall off

• **Throttle:** Footpedal type

• **Steering:** Stand up tiller or wheel

• **Safety feature:** A 28v receptacle can be provided permitting energizing of the drive motor from the generator aircraft plug This prevents operation of the unit while still connected to the aircraft it is servicing

The New York sales and service dealer is Schaffer Air Industries, Inc, 37-15 Eleventh St, Long Island City 1, N Y

Magnet Tool

Magnetic Pick-Up tool for retrieving nuts, bolts and other metal objects dropped into inaccessible spots is offered by **Herbrand division** of Bingham-Herbrand Corp, Fremont, Ohio

The magnetic head picks up tools weighing up to 2½ lb and is adjustable to permit reaching around corners and to get under and behind obstacles Head is 3½ in long and ½ in in diameter Handle can be extended from minimum length of 16½ to 27 in

Challenge for Transport Plane Designers

Sir Frederick Handley Page urges alternatives to costly, lengthened runways in Louis Bleriot lecture at Paris.

By David A. Anderton

The time has come, Sir Frederick
said, to speak of many things·
Of rocket-firing augmentors to
boost the lift of wings,
And other safety features that de-
signers' effort brings

In short, said Sir Frederick Handley Page in this year's Louis Blenot Lecture (Paris, May 4), the designers of transport aircraft have been so busy in their quest for higher cruising speeds that they have overlooked completely the other end of the flight range,

As a result, landing and takeoff performance have suffered, runways have required lengthening, and entirely too much money has been spent on large airports All these factors, stated Sir Frederick, are the result of the compelling lust for high speed

► **Speed and Runway Length**—Faster flight speeds imply a cleaner airplane through drag reduction Invariably, this means an aircraft of less wetted surface (that area of the plane which is wetted by the air passing over it) whose fuselage, wings, tail and nacelles have been shrunk to an irreducible minium

Air travelers will agree that passenger volume now appears to have reached the minimum figure, and hence fuselages cannot be reduced in size Powerplant sizes determine nacelle wetted surface, and the niceties of control fix tail volumes The designer gleefully pounces upon the one remaining shrinkable surface—the wing

Tacitly assuming that runways can be lengthened if need be to accommodate his hotter brainchild, the designer chops square yards off wing area, and permits the wing loading to approach fighter values

But there is a limit, Sir Frederick says, in the exteoded runway policy

• First, few countries can afford to extend many of their landing strips, let alone build new fields with increased runway lengths (One runway at London Airport cost almost $3 million for a 10,000 ft length planned runway for an alternate airport at Washington will cost $14 million, including land, access road and construction.)

• Second, many airports are geographically incapable of being extended because of the surrounding areas Alternate sites don't seem to be the answer, because they would probably have to be located even farther from the cities they now serve.

No, says Sir Frederick, these problems should be licked at the start in the design of the transport aircraft

► **Aerodyname Problem**—Most logical place to start is with the improvement of wing lift The subject has already been treated quite exhaustively in many wind tunnel tests, flight tests and theoretical calculations

As an example of what kind of takeoff run improvement is possible with some sort of super high lift device, the Handley Page Hermes IV was assumed to have an available maximum lift coefficient of 3·5 (about 90 percent improvement over its normal value) For such a staggering figure, the distance required to clear a 50-ft obstacle on takeoff is reduced from 1380 yd to about 800 yd

But as lift coefficient increases, so does induced drag To keep that portion of the drag unchanged while boosting the lift, it is necessary to increase the wing aspect ratio. This means span increase and, as a direct corollary, wing weight increase

Thus the circle has been completed, because in order to improve the takeoff performance, a series of changes has been made to the aircraft which succeeds in increasing its takeoff gross weight, largely nullifying any improvement

Therefore, Handley Page's paper states, the problem is to find a light weight high lift device

► **Flaps Helped**—In the beginning, there were flaps of a simple nature These generally served only to increase the wing camber and improve the aerodynamic circulation Later, the flap was translated aft as well as rotated (Fowler or Zap types, for example) and an effective increase in wing area was obtained

Still fancier variations on the theme were developed with slotted double-slotted and nose-plus-slotted flaps In these devices, the additional lift comes from energy transferred from the airstream to the boundary layer, a stratagem which increases the circulation around the wing Obviously, there is a natural limit to such energy transfer, and it occurs when there is no more available energy in the airstream which passes over the wing

For even greater lift increments, then, airstream energy must be supplemented artificially That idea becomes the basis for forced boundary layer control for additional lift

► **Extremely High Lift**—Wind tunnel tests on two dimensional models of wings with boundary layer control have shown maximum lift coefficients as high as 7, although it must be realized that such a value is nearly ideal In practice, the amount of air which must be artificially moved over the wing is large indeed, and the horsepower required to do the job becomes immense For example, the Hermes IV would require about 840 hp to give it a maximum lift coefficient of 3·5, 1220 hp for 4·0, and 2350 hp for 5·0 Power systems like this have not been obtainable for light weights

Progress with boundary layer control has been slow, then, for the two reasons above: power expenditure required, and weight of such power-producing equipment

► **Rocket Suggested**—The Germans, without whom there would have been a dearth of ideas in aircraft design, tested a rocket-operated feed pump to give air movement over the wing of an Arado 232 This scheme worked well enough, but was toyed with for six years without ever reaching flight tests

Sir Frederick suggested that the rocket principle be used, but on the Hermes IV, it would drive an air ejector In this device, the high-energy, low-mass stream of the rocket motors is used to accelerate a large mass of air, producing an overall thrust larger than that obtainable by rockets alone Fuel for two landings and two takeoffs would be provided for a total of three minutes operation

Rockets would be of the so-called "cold" type, using hydrogen peroxide with sodium or calcium permanganate as a reactor By the time mixing with the entrained air was complete, the temperature of the combined jet would have been dropped to about 200 F. from the original rocket exhaust value of over 900 deg F

► **Practical Application**—There are limits in developing high lift increments beyond which it does not seem wise to go

For instance, the power required to develop a maximum lift coefficient of 5.0 is about 10 times that for 3.0. The gain in takeoff performance is not improved by that factor at all; there is only slight difference between the two figures. The Handley Page study then limits the desired value of $C_{L_{max}}$ to 3.5, at which the required horsepower (840) becomes reasonable.

Further figures for weight of installed equipment and fuel were given as 3550 lb., of which less than one-third is equipment.

The use of a boundary layer control system does not preclude the installation of flaps, in fact, to reduce the power required, it is necessary to have the wing fitted with them. The preference quoted was for full-span flaps with a spoiler system for lateral control.

▶**Controversial Point**—One of the conclusions advanced by Sir Frederick was that the use of rockets for boundary layer control was more profitable than using them as JATO units. He gave some specific figures, wherein the Hermes IV was assumed to have an available maximum lift coefficient of 4.0, and to be equipped with rockets and fuel. The distance required to take off and clear a 50-ft. obstacle becomes 770 yd. with rockets used for boundary layer control as against 1369 yd. using JATO.

The point of argument here is that for some reason, the JATO rocket firing time has been limited to 9 sec. for the analysis, when it had been previously stated that there was to be fuel for four operations at 45 sec. per firing. Obviously, a five-fold increase in burning time would lift the Hermes IV over the obstacle in well under 1369 yd.

Unfortunately, not enough of the calculations and data required to check these figures were given.

Regardless of this point, it should be noted that rockets used as JATO are absolutely useless in increasing the maximum lift of the wing and therefore of no value in reducing the stalling speed and landing run of an aircraft. (This latter statement does not include the possibility of backward-firing JATO, a procedure not likely to be greeted with any great measure of joy by passengers and pilots.)

▶**Suggests Gear Elimination**—As a further step in the reduction of runway requirements, Sir Frederick suggests a hard look at the landing gear of a transport aircraft. On the Hermes IV, the undercarriage contributes little more than 4 percent of the gross weight, but that figure is almost 25 percent of the payload. Obviously the potential pay load lost is considerable.

There are types in operation which do not use normal landing gear. Of these, the best-known example is the flying boat, whose controversial position is side-stepped neatly by the statement that the limits of the paper do not permit complete evaluation. A less-publicized example is that furnished by the Royal Naval Air Force, which made some rather extensive experiments in landing wheel-less aircraft on a resilient mat that was superimposed on the carrier deck.

The requirements for any device which replaces the old-fashioned landing gear are these:

- **Non-interference** with normal aircraft landings and takeoffs.
- **Quick clearance** of landing areas.
- **Ease of taxiing.**
- **Economics of initial cost** and upkeep superior to runways.
- **Simple and reliable** operation to retain passenger confidence.

▶**Alternates Considered**—The use of lower tire pressures would mean a possible return to sod runways, but it would also mean excessive numbers of wheels and near impossible stowage problems would be involved.

Tracks, instead of wheels, would give greater freedom of operation on grass, but they are heavier and require more upkeep.

Best alternate seems to be the use of a multi-wheeled bogey (cart) which could be operated from grass runways. At unsticking, the bogey is released and left on the ground. A further refinement that may be considered would be to power the bogey to reduce the takeoff run further.

With no landing gear, a skid would be needed for loading onto the bogey and more important, for landings. The skid would be better for braking than current wheeled gear, and eliminate the locking of wheels which might otherwise occur.

Practical difficulties beset this scheme, though. If a standardized bogey were evolved, then each aircraft design would be penalized somewhat to fit.

If separate bogeys were designed for each ship, then the airports would soon

OLD • • • KAMAN COPTER BLADES • • • NEW

Counterweights on Kaman Aircraft Corp.'s copter blade (left) have been eliminated in new design (right). Old type has two counterweights mounted on leading edge to give proper chordwise balance, whereas balance in new blade, approved by CAA, is accomplished with metal rod burned spanwise beneath stainless steel leading edge, running from servo-flap bracket to blade tip. Rubber anti-abrasion boot, mounted on edge inboard of bracket, is also new. Company's K-225 copter has CAA-approval for night flying. Running lights are carried on port and starboard rotor shaft pylons and tail surface. Two 250-w. visual reference lights are mounted beneath fuselage. Instrument panel has indirect lighting. New blades and lights are optional on K-225.

become quite cluttered with many multi wheeled carts

But the gains to be met, particularly in trans Atlantic service, are potentially so great that development of the undercarriageless aircraft has a very strong case

▶ **Challenge to Designers**—Although Sir Frederick did not say so in specific statements, his challenege to aircraft designers was clearly read between the lines of everything in his paper Basically, he told the aircraft companies

- **Stop depending** on runway improvements to handle your faster flying, faster landing transports
- **Conduct more practical research** on the low speed side of the flight range
- **Consider strongly** the possibilities in boundary layer control and in elimination of landing gear

Sir Frederick's paper contains the kind of challenge needed periodically by the aircraft industry here and abroad, the kind of stimulating thought that makes some wide-awake designer take notice His ideas were presented free, with no strings attached Who is going to develop them for eventual use?

Plating Scheme

New phosphorus alloys ease deposit problems, have many applications.

A "commercially feasible" method for producing electrodeposits of new phosphorus alloys, which could replace chromium plate in many applications, has been developed at the National Bureau of Standards

The process, perfected by NBS technicians Abner Brenner, Dwight E Couch and Eugenia K Williams, utilizes cobalt or nickel alloyed with as much as 15 percent phosphorus Research has shown these alloys are more easily deposited than chromium, are very hard, corrosion resistant and are also bright

Uses for these materials are indicated for gages, cylinder walls, piston rings and other machine parts where resistance to wear is considered an important factor

Plating baths consist of common nickel or cobalt salts such as the sulphate or chloride, to which is added phosphoric acid as a source of phosphorus in the deposit The baths are operated at a low pH, between 0 5 and 1 5 depending on the composition To maintain the desired acidity in the cathode film, the solution must be buffered

NBS says it has found that phosphoric acid is one of the best chemicals for this purpose

The plating baths are kept at 75 C. or above, because at room temperature the cathode current efficiency is very low and the deposits are weak Current densities should be between 5 and 40 amp per square decimeter At the usual current density, about 10 amp /sq decimeter, the rate of deposition is fairly high, amounting to a few thousandths of an inch per hour

Appearance of the deposits depends on their phosphorus content Alloys with less than two percent are usually smooth with a mat finish As the percentage of phosphorus increases, the alloys become brighter, reaching a peak of brightness at a content of about 10 percent

And when such deposits are plated on a dull surface, brightness increases as they become thicker Because of the slightly dark cast of the high phosphorus alloys, their reflectivity is 45 to 50 percent, compared to 60 percent for buffed nickel coatings

Photomicrographs of the low phosphorus alloys show a columnar structure, while high phosphorus alloys have a banded structure X-ray diffraction patterns of the high-phosphorus alloys do not exhibit any crystalline composition

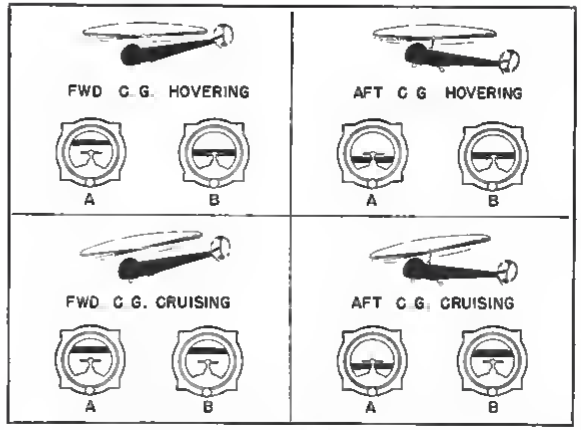
When heat-treated, deposits develop a fine-grained structure instead of the large crystals characteristic of pure nickel or cobalt

Hardness of the deposits as plated varies from 350 to 720 Vickers scale, hardness increasing with phosphorus content

If the alloys are heat-treated at 400 C, they become much harder For example, a heat treated cobalt-phosphorus deposit containing about ten percent phosphorus reaches a hardness of 1100 Vickers, which is greater than that exhibited by electrodeposited chromium

Deposits heated as high as 800 C, and cooled are not much softer than the initial deposit However, the alloys have poor "hot hardness" and above a temperature of 600 C are softer than unalloyed nickel or cobalt While low-phosphorus alloys become ductile after heat treatment at 800 C, deposits containing more than one percent phosphorus generally have been found to be brittle

NBS experiments show nickel alloy having 10 14 percent phosphorus was attacked considerably less by hydrochloric acid than was pure nickel While phosphorus alloys are not as white as bright nickel, NBS says operation of the baths is much less critical than for proprietary bright nickel Phosphorus alloys can be plated from a bath made up entirely of inorganic chemicals while bright nickel plating solutions must contain an organic brightening agent.



FOUR CONDITIONS of stabilized helicopter flight are shown, with the attitude of the fuselage exaggerated for illustration. Instrument A is a standard fuselage-based gyro horizon, and B is a gyro modification which reads rotor attitude. It will be seen that CG position produces no effect on rotor attitude indication.

Rotor Tell-Tale Aids Blind Flight

Bell Aircraft study shows fuselage attitude misleading in helicopter instrument flight at less than 40 mph.

Flying by rotor attitude is a step toward satisfactory instrument flight in helicopters, according to Owen Q. Niehaus, chief test pilot of Bell Aircraft Corp.

This new approach, in which rotor disc angle rather than fuselage attitude is monitored, was advanced by Niehaus in a paper presented at a recent American Helicopter Society forum.

Bell's study, which Niehaus summarized, was concerned with finding a more satisfactory solution to the horizon problem. The obvious first approach was to use a standard gyro horizon indicator. This technique worked adequately for flight speeds greater than about 40 mph., where the helicopter behaved like a conventional aircraft. In the range below 40 mph., the horizon indication was no longer adequate, because of the lag between rotor and fuselage displacement following a disturbance.

The swashplate indicator device was thoroughly considered before being abandoned. In this case, the pilot gets information as to the position of the cyclic control stick relative to the fuselage. Such information, although of some value in a statically stable helicopter, lacks the horizon reference which is necessary to maintain dynamic control.

Actually, there are two requirements for a satisfactory attitude indicator: a source of intelligence, and a method of presentation.

Bell Aircraft's answer to these requirements was a device to provide rotor attitude information with respect to the fuselage.

▶ **System Advantages**--There are three major advantages of such a system:

- **The rotor disc** has only one tilt angle for any given stabilized flight velocity.
- **Change of rotor tilt** angle with velocity is completely independent of CG position and helicopter fuselage pitching moments.
- **Any deviation from rotor attitude** immediately produces a velocity change, enabling the pilot to anticipate a change and correct for it.

An experimental device to accomplish the purpose uses a Selsyn transmitter which provides a voltage proportional to the relative angle between rotor and mast. Longitudinal and lateral components of tilt are obtained with a slip-ring which has pick-offs displaced 90 degrees apart.

Fuselage attitude relative to the horizon is sensed by a gyro which supplies a voltage proportional to the body tilt. This voltage, and that supplied by the Selsyn transmitter, are amplified and compared. After the comparison, the resultant output voltage is displayed on a sensitive dc voltmeter.

The results of several weeks of flight testing have been very promising. Niehaus claimed that for the first time it was possible to hover, under blind flying conditions, for three or four minutes with zero airspeed, plus or minus two or three mph. Over-controlling, normally associated with blind hovering, has been eliminated for the most part, it is reported.

▶ **Further Testing**--Further flight-testing and development of a better presentation method is indicated, along with the possibility of including a rate derivative in the presentation. The latter step might provide the additional anticipating necessary to reduce even further tendency to overcontrol.

No earth shaking claims are made for this concept by Bell Aircraft Corp., but they do believe that they have taken a step in the right direction toward satisfactory instrument flight throughout the helicopter's flight speed range.

New Machine Eases Blade Polishing Job

Elimination of another laborious hand-finishing process in the production of gas turbines was announced this week by Avro Canada Ltd., of Malton, Ontario. The process: finish polishing of turbine blades. The eliminator a unique machine developed by Avro's J. O. Creek.

▶ **Fundamentals**--Basic part of the machine is an annular trough containing a polishing agent. The blades pass in single file through the trough. As they move they are oscillated slowly about their vertical axes.

The trough has a series of ramps built into the bottom and rising into the direction of head rotation, which give what Avro calls buoyancy to the polishing agent. In addition, air jets blow through the bottom of the trough below the path of the blades and serve to agitate the polishing material further.

The machine head is mounted to rotate in a horizontal plane coaxially with the plane of the trough. Around the periphery, the head carries 20 blades extending downward into the trough, each blade root being mounted in a chuck on a vertical spindle. Pairs of spindles are connected at their upper extremities by short shafts carrying bevel gears, which mesh with bevel gears at the top of the spindles. Gearing is such as to produce opposite rotation of the blades.

▶ **Oscillating Blades**--At the center of each horizontal shaft is a pinion gear, which meshes with a vertical rack. Vertical oscillation of the rack produces a rotary oscillation in the blades about

either of two neutral positions—positions which correspond to zero average incidence of the blade meeting the polishing agent, either leading or trailing edge foremost.

Vertical adjustment of the rack permits the blade to be rotated through 180 deg and then oscillated about either neutral position.

Blades are moved through the polishing agent at a speed of approximately 560 fpm.

▶**Surface Finish**—After 15 min. operation on aluminum alloy blades, Mr. Creek's machine can produce a surface smoothness on the order of 3 microinches without affecting materially the blade contour. It is also possible to round off leading and trailing edges, left flat by flash removal from light alloy forgings, without seriously altering the contour elsewhere on the blade.

Use has been made of this machine in Avro Canada's Orenda gas turbine program.

Package Porthole

Those who have had to service dehumidified packages of equipment in storage will appreciate a simple little gadget devised at the Army Engineer Research and Development Laboratories, Fort Belvoir, Va.

The device is a small plastic window, resembling a porthole, which unscrews to permit access to the interior of the package. It can be installed by semi-skilled personnel in about eight minutes either at the time of packaging or in packs already made.

Size of the porthole is large enough to permit replacement of the desiccant usually found inside. Thermometers or humidity gages may be fastened inside the pack and read through the window.

According to laboratory tests, the window has little effect on the amount of moisture vapor transmission of the package.

New Coated Aluminum Is Wear Resistant

Coated aluminum, with twice the wear resistance of cyanide case hardened steel, has been developed by the Glenn L. Martin Co.

The file hard coating—a non-metallic, highly heat refractive surface—is bonded strongly to the base metal by an electrochemical process. Usable surface thicknesses vary from .0001 to .006 in., with abrasion-resistant applications generally using .002 in.

▶**Two Year Development**—Basic work on the new finish—designated MHC by the Martin Co—was done by C. F.

(Continued on page 30)

BLASTING BEAUTY!

Sleek, high-speed, powerful—the Martin XB-51 is the Air Force's first postwar plane specifically designed for supporting our ground forces.

Blasting enemy supply lines and installations to help keep our ground forces rolling—that's one of the roles the new Martin XB-51 is designed to play in America's preparedness program! It's a teamwork bomber—versatile, powerful, super-fast, highly maneuverable, designed to be capable of operating from combat area fields. Its lines are clean and graceful, yet radically different. A unique power plant arrangement includes two jets mounted on fuselage pylons and a third in the tail. Drastically sweptback wings, a T-shaped tail and tandem landing gear—plus many other features still classified under military security regulations—make it as modern as tomorrow!

Like all Martin developments, the XB-51 is the product of a highly skilled engineering team. Electronic, aerodynamic, metallurgy research, servo-mechanism studies—all play their parts in the technical leadership Martin offers its customers today. All play their parts as Martin extends research frontiers in advanced design aircraft, rocketry, jet propulsion, supersonic missiles and other far-reaching fields! THE GLENN L. MARTIN COMPANY, Baltimore 3, Maryland.

Powered for faster starts, the Martin XB-51 is designed to have great versatility for operations to and from smaller combat area fields. For landings, the new Martin bomber has a parachute stowed aft which may be released at the pilot's discretion for more rapid deceleration.

Martin AIRCRAFT

Builders of "Dependable" Aircraft Since 1909

Manufacturers of: Military aircraft • Martin airliners • Guided missiles • Rocketry • Electronic fire control and radar systems • Precision testing instruments **Developers and Licensors of:** Marquardt metal-forming • Marform metal-forming (to U. S. Rubber Co.) • Honeycomb construction material (to Hydropress, Inc.) • Honeycomb construction material (to U. S. Plywood Corp. and Aircraft Die Cutters) • Structural adhesives (to U. S. Plywood Corp. and Bloomingdale Rubber Co.) • Permanent fabric flameproofing (to E. I. duPont de Nemours & Co.) • Hydraulic automotive and aircraft brakes **Leaders in** Building Air Power to Guard the Peace • Air Transport to Serve It!

carrying air power's story to *America*

air power to guard the peace, air transport to serve it! That's the story Martin advertising develops for millions of alert American readers. Attention-getting advertisements like this reach the general public and business circles in *Time*, *Newsweek* and *Business Week* . . . explain aviation's important role in our country's preparedness program and in the development of travel facilities. "Martin Air Memos" bring news of latest developments to the men and women who write and edit the news through *Editor and Publisher*, *American Press* and *Publisher's Auxiliary*.

engineering has become food for discussion even among laymen in this highly technical age. So this advertising also highlights the manner in which Martin *systems engineering* is meeting the challenge of tremendously complicated air power needs. Today, the Martin engineering staff is designing aircraft and missiles as integrated air-borne systems, not merely as flying vehicles. Martin design work embodies electronic flight and navigational controls and military armament or passenger facilities, as well as airframe and power plant. And the complete development of the aircraft or missile is so scheduled that the end product represents a completely coordinated system.

A well-informed public . . . fully aware of preparedness needs, problems and measures . . . is one of the finest safeguards for peace. Martin advertising helps spread the facts!

THE GLENN L. MARTIN COMPANY, Baltimore 3, Maryland.

Martin AIRCRAFT

Builders of Dependable Aircraft Since 1909

Burrows, Martin research metallurgist. Development work followed for two years in the laboratory. Currently the full field of applications for the surfacing process gives the appearance of having been hardly explored.

MHC finish has already been applied to "such widely dissimilar items as gears and pinions, surveying instrument parts, turbine impeller blades, hand tools, the leading edges of high-speed airfoils and leg braces for paraplegics."

► **Coating Properties**—Remarkable resistance of the new coating to wear has been shown by standard tests performed on a Tabor Abrasion Tester—after 50,000 cycles, MHC finish on aluminum showed only half as much wear as did cyanide case hardened steel.

A margin of heat protection is also afforded by the coating under conditions of transient high temperatures.

ENGINEERING FORUM

How Flashing Lights Affect Flight Safety

CAA is considering a regulation to require ALL aircraft to be equipped with flashing navigation lights for night flying. At present this is required on airline planes only. The move is an attempt to reduce the collision hazard existing on many crowded airways.

Flashing lights, it is felt, will attract more attention and eliminate confusion between stars and aircraft. This latter may seem a bit far fetched, there being no instance on record of a star-aircraft collision, but stars at various times appear red, green and white and have caused pilots more than a few anxious moments and an occasional evasive maneuver.

In all cases, save one, blinkers should solve the identification problem. The one exception is that of large cities with their twinkling lights.

According to pilots, however, identification is only half of the problem, the other is tracking or, more correctly, the projecting of a track. It is of little benefit to identify a plane at night unless the course of the ship can be determined and further that it can be determined whether the two aircraft are on collision courses.

The speed of aircraft eliminates the possibility of waiting for an apparent increase in the size and intensity of lights to indicate that the planes are coming closer together. Therefore projecting the apparent courses of the two ships along an infinite line is the only way to see if they will intersect. Today pilots use sort of a "rule of thumb" for the problem. If the other ship appears to be standing still then the ships are on a collision course (since the angle of convergence is remaining the same). A ship that shows definite movement need not be watched for the paths will not coincide.

To be sure these "rules" are not infallible.

► **Tracking the Blinking Things**—So the point in question on the flashing lights is: Can a

blinking" path be satisfactorily projected? One observer, who answered no, compared the situation to childhood attempts at catching fire flies on the front lawn after dark. And the point is borne out by pilots engaged in night training, where many ships are flying patterns around one field. They find it confusing to see several sets of flashing lights. The aircraft courses appear to be erratic—almost drunk. This same situation should hold true at all busy terminals especially against a background of city lights.

Further studies of the human eye reveal an inability to follow irregular flashes—as is realized when a television picture gets out of synchronization. The medics say that the flashes must be regularly spaced allowing practically no error in timing.

The evidence so far indicates two distinct problems:

- Identification
- Tracking

Best information is that flashing lights solve the first but not the second. The conclusion drawn by many experts is that in trying to solve one problem the other has been worsened. A better solution mentioned is a requirement that BOTH flashing and steady lights be installed for night flying. It is also pointed out that the flashing light system used on the airlines does not constitute a prima facie case for the lights.

Since the CAA must consider the cost of this set up in relation to the private plane owners, the installation must not be elaborate. The system must however, meet several specifications. Some of these:

- Safeguards against failure in the "off" position.
- Operation within the electrical system capacity of the small plane.
- Shielding against radio interference.

Several cases are known where newly installed mechanisms have failed on one or more of these points. Many pilots feel that the situation would be improved with some of these suggested possibilities:

- One bulb containing two filaments (one for steady, one for the flash).
- Two bulbs at each running light station.
- The addition of a steady fuselage or leading edge light.

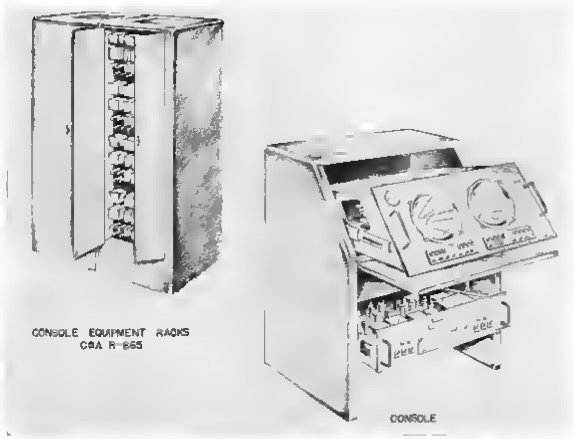
All concerned seem to agree that a doubling or tripling of intensity would help.

Real safety in the air at night, as far as the lighting situation is concerned will not be reached according to many, until various other ideas are investigated. Some mentioned are:

- Luminous outline of wings, tail and fuselage.
- A rotating beacon, patterned after those used on diesel locomotives.
- A system which will identify the "type" of aircraft (many for an indication of speed).

Whatever the outcome however, it should be uniform. Nothing is more disconcerting than an unfamiliar pattern of lights which must be deciphered before tracking can begin. At any rate there is strong feeling in many cockpits that the new regulation CAA is considering will not solve, rather it will change the problem.

R. C. Ronson,
Captain, American Airlines,
5975 Ninth St., North,
Arlington, Va.



PRECISION APPROACH RADAR built by Bendix will look like this sketch.

New Approach Radar Designed

CAA awards $2½ million contract to Bendix Aviation for airport surveillance and let-down equipment.

Electronic mapping is the new design feature of the Bendix ASR-3 surveillance radar, being procured by CAA for 28 civil airports in the United States and Canada.

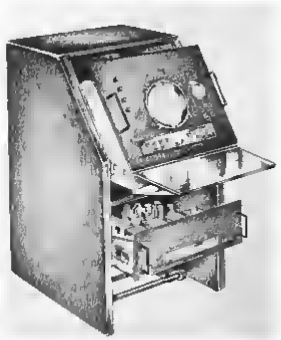
Contract, for almost $2½ million, includes airport surveillance radar (ASR-3) for 14 fields and precision approach radar (PAR 2) for 14 others, and the installation of these sets by Bendix.

Purchase marks another step in CAA's overall plans for the extension of air navigational facilities as recommended by the Radio Technical Commission for Aeronautics.

► **ASR Use**—Airport surveillance radar is used to keep an eye on the air traffic in the terminal area, and for guiding aircraft into the proper position for final approach, at which point PAR takes over.

Design requirement for Bendix ASR-3 included provision that set must be able to pick up a Piper Cub at a range of 30 miles, and larger aircraft targets at 60 miles.

► **New Faces**—In the past, a transparent overlay was made for the face of the ASR scope on which were marked the locations of obstructions, markers and radio ranges. Separate overlays were needed for each range radius possible with ASR, in addition, they were subject to parallax errors in reading.



AIRPORT SURVEILLANCE radar console

Bendix technique of electronic mapping eliminates these annoyances. Map of the area around the terminal is projected electronically onto the scope face in exactly the same manner as the plane pips are presented. The map changes with each shift of the range selector knob, and of course, shows no parallax.

Additional claims for improved azimuth resolution and range performance of receiver have been made. Statement of easier servicing and maintenance is hard to assess, since Bendix has not yet built any sets in their final form, but has only components and breadboarded circuits.

ASR-3 will also incorporate provision for attachment of automatic VHF ADF equipment.

► **Par for the Course**—PAR units are intended for use as final approach and landing aids (such as "talking down" with any CCA system), or for monitoring final approaches made with other systems, such as ILS.

PAR 2 as made by Bendix will be a substantial improvement over its predecessor in elevation, azimuth and distance performance. Stand-by transmitter and receiver are arranged so that they can be switched in immediately if anything goes wrong with the set in use.

► **Schedules**—Delivery and installation of the 28 units is scheduled to begin in summer of 1951. Cost of 14 ASR-3 units is $1,408,844; PAR 2 sets come to $1,070,708. Figures include installation at the airports.

Omnirange Antennas Get Plastic Domes

Large plastic domes to shelter omnirange antennas from weather have been ordered by the Civil Aeronautics Administration to replace square wooden structures now perched on the top of omnirange towers.

CAA has placed an order with E. L. Command, Inc., New York, N.Y., for 100 of the new domes at a cost of about $43,000. They will be 8 ft. in diameter and about 7 ft. high—making them the largest plastic moldings ever produced in quantity, according to CAA. First deliveries are expected late this summer. Subsequent orders are expected to bring total procurement to 400.

Omnirange stations wearing these new skullcaps will appear as small buildings surmounted by metal-covered decks about 35 ft. in diameter, in the center of which will be the 350-lb. plastic domes.

The order is the result of tests conducted by the CAA Technical Development and Evaluation Center, Indianapolis. It was found that polyester resin impregnated glass fiber laminate offered these advantages over wooden structures now used: uniformity of thickness, low moisture absorption and minimum interference with transmitted signals.

CAA now has more than 300 omni range stations operating in the U. S.

SALES & SERVICE

LANDING APPROACH Cub aims its hook-on gear at cable-suspended trapeze. For . . .

TAKEOFF, plane is hoisted into position and trips release when fully revved up

Cable Airport System Promoted

CAA approval for Brodie short-field landing and takeoff aid sparks commercial drive. World-wide market sought.

Baltimore engineer James H. Brodie is shaping up domestic and foreign sales outlets to push a simplified commercial version of his unusual suspended landing and takeoff strip.

The project got a push about a year ago when Civil Aeronautics Administration gave the device official approval. Brodie has made arrangements with several Baltimore firms to manufacture the special components. Next step is to line up a sales organization to make the venture pay off.

The most promising distributor deal appears to be with Frank Sheridan Jonas, New York aviation exporter, whose contract gives him an exclusive field, excepting the U. S., Canada, Alaska, the British Commonwealth, Norway, Sweden, Denmark and China. The exporter thinks that France offers the best market at present, considering the exchange problem.

Norway and Sweden are being covered by Arnfin Brode Sen of Oslo.

In this country, Louisville Flying Service, Ky., has picked up the Kentucky and Midwest rights, while Art Whitaker, Oregon, is now making a market survey.

▶**Costs**—The landing and takeoff rig is priced at $5375 f.o.b. Baltimore, with cost of erecting the installation estimated at another $500. The hook-on gear kit lists for $184, with installation charge being about $20. It is claimed that no modification is necessary on the aircraft being fitted with the Brodie gear. Kits are now available for the Piper J-3 and PA-11 types.

▶**Technical Details**—The Aerial Track Runway consists of a ⅜-in. steel cable 600 ft. long suspended 50 ft. above the ground. Four wood masts are positioned at the corners of a 760-ft. x 160-ft. rectangular area, with each mast independently guyed to be self-supporting. A bridle cable runs from each mast to support the center runway wire. Sag on the runway cable is stated to be about five feet.

To land, a plane is flown just below the level of, and in line with, the runway cable. The plane's hook-on gear engages a large Nylon rope sling, which is attached to a trolley. The plane's motion carries the trolley along the center cable about 350 ft. Thus travel is controlled by an automatic arresting unit which pays out a light cable under a constant predetermined tension.

The plane is lowered to the ground by slackening the main cable by means of a nine horsepower winch.

For takeoff, the plane is hoisted into position, with the tail secured by a rope leading to an anchor fixed in the ground. On revving the engine to maximum power, the pilot releases the holding rope by tripping a release coupling and accelerates to flying speed. The pilot then releases the plane's hook-on gear from the cable trolley and takes off between two end poles.

The apparatus is identical at both ends so that an airplane can land or take off in either direction. Maintenance on the device is said to be negligible, and operation requires only one attendant.

Manufacturer is the Brodie Engineering Corp. with offices at 2107 Maryland Ave., Baltimore 18, Md.

BRIEFING FOR DEALERS AND DISTRIBUTORS

▶**Sales Firm Formed**—Vosler Associates has been established by Kenneth D. Vosler to handle sales and representation of aircraft and industrial materials. Vosler had formerly been connected with Edo Corp. since 1925. Joining Vosler are Ernest R. Cottle and A. A. Rice, also previously with Edo. Offices of the concern are at 100-05 Metropolitan Ave., Forest Hills, L. I., N. Y.

▶**Sperry Products Rep**—Charles T. Morgan, 21 Lothrop St., Beverly, Mass., has been named manufacturer's representative in eastern New England by Sperry Products, Inc. Mr. Morgan will handle non-destructive ultra-sonic testing instruments, hydraulic remote controls, self-sealing couplings and transformers for the Danbury, Conn., concern.

FINANCIAL

Why No Action on Mergers?

CAB favors airline combines, but has no compulsory power. And its regulations make agreements difficult.

Merger talk is again rife among the domestic airlines. It is known that National made an offer to acquire Northeast which countered with a bid of its own for the former.

In the background loom discussions of reviving the smoldering proposals of years ago. Despite the professed interest of many of the carriers, nothing whatsoever came from all of these combined efforts. It is unlikely that any major consolidations can be effected under existing conditions regardless of the various feints now in evidence.

(The American Overseas acquisition by Pan American is distinct from usual merger proposals because of the international elements involved and the lack of complete control by the Civil Aeronautics Board.)

▶**Mergers Desired**—The chairman of the CAB has publicly stated his encouragement of "desirable" mergers. So far, none has come forward, excepting the Rocky Mountain area feeders.

In proposing the separation of compensatory mail pay and subsidy awards on a community basis, Senator Johnson, chairman of the Committee on Interstate and Foreign Commerce, believes that it would be possible to determine when and where mergers should be made. The exact workings of this particular system are unclear. Of greater consequence, it may take some time before the desired separations can be effected on the community basis.

Regardless of how desirable a number of mergers may be, present circumstances are not conducive to such action. The free play of economic forces is not permitted to operate in the regulated air transport industry.

As long as a carrier has the right to expect sufficient mail pay, under stated conditions, to make past, present and future operations whole, there is no real incentive to negotiate desirable mergers or consolidations.

▶**Leadership Wanted**—A significant observation in this respect was made by CAB Member Josh Lee in his recent speech at Oklahoma (AVIATION WEEK May 29). He asserted:

"Unless the Board leads the way in recommending the merging of certain carriers, there are likely to be either no proposals at all for merging or else the wrong proposals. But the Board, because of its objective position, could recommend mergers that would be in the public interest and then assist in providing referees and arbitrators to effectuate agreements."

Consolidating airlines would appear to be much easier than merging railroads. Airlines have great flexibility. Their chief asset is a franchise which gives them a "right-of-way" in the sky. There is no heavy commitment by the air carriers comparable to that expended by the railroads in fixed property.

▶**Obstacle Course**—Actually, the airline merger path is a most intricate one, beset by many obstacles. Many have tried. But until very recently—and then in a relatively minor instance—none had succeeded in effecting a bona fide merger since the time commercial aviation came into its own with enactment of the Civil Aeronautics Act of 1938.

The only real merger occurred when three Rocky Mountain area feeders were recently combined into a single operation under Board approval. This was accomplished in stages and was made simpler by the concentration of control of the separate properties in a few limited hands. The carriers involved were Monarch, Challenger and Arizona which were merged to form Frontier Airlines as of June 1, 1950. Temporary certificates of public convenience and necessity were involved in this instance and may have been a facilitating factor in this logical combination.

For the trunklines holding permanent certificates, the hurdles have been many and complex in attempting to effect some desirable combinations. Physical assets are not difficult to appraise. But placing a price on a "franchise" is a troublesome issue and many a proposal collapsed in the attempt.

▶**Who'll Be Boss?**—Strong personalities of airline chiefs have also clashed in the showdown on who was to become head man in any merged system.

Then, once agreement at the top level is accomplished, proposals must obtain the sanction of the separate boards of directors and after that approval from stockholders. Dissident groups can place any compromise plan in jeopardy.

The biggest obstacle remains in obtaining CAB approval. Board approval is required of any consolidation merger, lease, operating contract or acquisition of control of any certificated carrier. The Board must find that such proposed arrangement is in the public interest before it can become effective. The law directs the Board not to approve any arrangement which would result in creating a monopoly [illegible] or jeopardize another air carrier not a party to the agreement."

Armed with this directive, the Board and its predecessor, the Authority, were called upon to approve mergers and consolidations advanced in the past.

▶**If at First**—The Authority, in 1940, approved TWA's acquisition of Marquette, a small Midwest feeder. A year earlier, the same proposal was turned down by the Authority with the assertion that the purchase price was excessive. The price was reduced to win subsequent approval.

Western Airlines was allowed in 1943 to acquire control of Inland Airlines, a smaller operator in the Mountain States area.

These two acquisitions were the only ones to gain official approval in the domestic field. The issues were noncontroversial with little opposition from competing carriers.

▶**Rebuffs**—Other merger proposals were less fortunate. After approval by a special CAA examiner, the Authority in 1940 denied United's application to acquire Western. Main reason given was that the size and control of United would adversely affect the competitive position in that area. It is interesting to note that in 1947 United was permitted to buy the Denver-Los Angeles route from Western.

American attempted to acquire Mid-Continent through an exchange of stock. The proposal was turned down by the Board in 1946 on the grounds that it would merely add to AA's bigness and no community of interest existed between the carriers.

At one time a Capital-Northeast merger was advanced and received a favorable nod from a CAB examiner. The then deteriorating financial condition of both carriers caused the voluntary withdrawal of this deal.

Coming down to the present, the fact remains that CAB has no power to initiate action compelling the airlines to merge. It can, however, prod in both official and unofficial actions. Control over the award of mail compensation is a powerful weapon in this respect but the Board has been reluctant to apply it in this manner. Action leading finally to physical combinations can be set in motion by Board-inspired equipment interchanges among separate carriers.

In any event, it may take Board initiative, possibly buttressed with new powers, to effect any worthwhile mergers among the domestic air carriers.

—Selig Altschul

WHAT'S DOING
at Pratt & Whitney Aircraft?

The most powerful jet engine now streaking through the skies in the United States is the J-48 Pratt & Whitney Turbo-Wasp. Already it is flying in two of the most advanced special-purpose fighter planes for both the Navy and the Air Force.

One is the sleek Grumman Panther (F9F-5) for Navy carrier-based operations. Another is North American's swept-wing F-93A deep penetration fighter for the Air Force. Both of these first-line military aircraft are capable of speeds in the transonic range — 600 miles an hour plus. The J-48 gives to each of these airplanes more power than a four-engined bomber of World War II.

Two of the world's foremost aircraft engine manufacturers — Pratt & Whitney Aircraft and Rolls-Royce, Ltd. — pooled their engineering talents to develop the J-48. And, working independently of its British partner, Pratt & Whitney made a major contribution to improved performance by perfecting an afterburner. It provides greatly increased thrust for take-offs, climb and for short bursts of extra speed in combat.

This hands-across-the-sea teamwork saved time and money, produced a jet engine more powerful than its competitors, and made it available to military services of both countries much sooner than otherwise would have been possible.

Before its successful flights in military fighter planes, the J-48 had completed nearly two thousand hours of ground development testing and several grueling 150-hour endurance tests. During those tests, the engine delivered considerably more power than its guaranteed ratings, both with and without afterburner.

Such extensive flight and ground tests help make it possible to give the J-48 Turbo-Wasp the same built-in dependability and high performance that always has been the hallmark of Pratt & Whitney piston engines — engines that power so many military and commercial airplanes.

The J-48 is the logical successor to the J-42 jet, which has been in production for the Navy more than a year. But the J-48 is not the final answer to aircraft power requirements. Pratt & Whitney Aircraft's engineering and development teams have even further advanced turbojet and turboprop engines running as complete units on experimental test.

HOW MUCH POWER IS PROOUCED BY THE J-48 TURBO-WASP?

- ☐ 8,000 Hp.?
- ☐ 9,000 Hp.?
- ☐ 10,000 Hp.?
- ☐ 11,000 Hp.?

Jet power is measured in terms of pounds of thrust, but, as you know, it can be translated into horsepower. The J-48, which has a basic dry thrust rating of 6,250 pounds, will provide the equivalent of about 11,000 horsepower for a fighter plane at high operating speeds. That's more than four times the power output of the most powerful fighter of World War II. Water injection and an afterburner give the J-48 even greater power increases for short periods.

WHAT IS THE RATIO OF POWER TO WEIGHT OF THE J-48?

- ☐ 1 to 1?
- ☐ 2 to 1?
- ☐ 4 to 1?
- ☐ 5 to 1?

The goal of one horsepower for every pound of engine weight was reached by piston engine manufacturers only after years of effort. But in the field of jet power that ratio has already been far exceeded. The J-48 weighs less than 2,000 pounds and, at the high operating speeds of the fighters in which it is installed, it delivers the equivalent of more than *five* horsepower per pound of engine weight.

HOW WAS THE J-48 MAOE MORE POWERFUL THAN THE J-42?

- ☐ Increased Airflow?
- ☐ Greater Diameter?
- ☐ Longer Turbine Blades?

One of the toughest problems in designing the J-48 was to increase airflow without increasing engine diameter. By redesigning the impeller to compress more air and by lengthening turbine blades, the engineers increased air consumption by 30 percent and that, in turn, produced more thrust power. It sounds simple, now that it has been accomplished. But it required thousands of hours of designing and testing, first of component parts and finally of completed engines. And yet the over all diameter of the J-48 is only 50 inches — almost exactly the same as the J-42.

WHEN WILL THE J-48 BE IN ACTUAL PROOUCTION?

- ☐ Summer 1950?
- ☐ Fall 1950?
- ☐ Winter 1950?
- ☐ Spring 1951?

The first experimental model of the J-48 Turbo-Wasp was installed, after extensive testing, in a Grumman F9F in November, 1949. Next came the pre-production engines, several of which are now installed in combat aircraft. Currently, production tooling is well along and the first production engine is scheduled to roll off the line early this fall. Even as this work goes on, Pratt & Whitney engineers are following their historical pattern of simultaneously producing the best engines today and continuing research for even better power plants tomorrow.

PRATT & WHITNEY AIRCRAFT

EAST HARTFORD, CONNECTICUT

ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION

Scheduled Lines Take Coach Lead

They fly far more low-rate traffic than the nonskeds, but now have another worry: Is it making money?

By Charles Adams

Air coach, under new management, has generated a bargain fare traffic boom far larger than anything seen in the heyday of the nonscheduled carriers

As in the case of air freight, the certificated airlines have grabbed the ball in the contest for cut rate passenger traffic But the irregular operators, pioneers in the coach business, can't be counted out of the game yet, although their future appears bleak as long as the Civil Aeronautics Board—acting as umpire—continues to call decisions against the nonskeds

► **Half-Million Passengers**—From Nov 4, 1948, when Capital Airlines started the first scheduled domestic air coach service, through Apr 30, 1950, the certificated domestic trunklines flew more than 541,000 passengers on the low fare flights In addition, Pan American Airways, Northwest Airlines and Braniff Airways have flown around 150,000 coach passengers to Puerto Rico, Alaska and South America

By contrast, U S nonscheduled carriers handled only 125,000 to 150,000 customers during 1949 on domestic, Puerto Rican and Alaskan routes combined

Ten certificated domestic carriers have hopped on the air coach band wagon during the past 18 months American, Capital, Delta, Eastern, National, Northwest, TWA, Western, Continental and Mid-Continent The latter two dropped the service last year, when sufficient business failed to develop over low-density routes Two other operators, United and Chicago & Southern, plan to start coach flights next month

► **EAL Moves Up**—Capital Airlines carried the most coach passengers through Apr 30, but Eastern Air Lines—a comparative late-comer to the business—was catching up fast In first-quarter 1950 EAL handled 51,256 coach riders, compared with 34,806 for Capital

During the first three months of 1949 less than 1 percent of the passengers on the certificated domestic trunklines were coach customers By first-quarter 1950, the proportion had risen to more than 6 percent

Big question mark in the certificated carriers' coach business is whether it has made money Capital, Northwest and National claim the low-fare business has boosted their profits substantially

EAL President E V Rickenbacker has his doubts, although he thinks there are compensating benefits resulting from the large number of first riders being drawn to the airlines by the low fares These coach passengers are likely to become regular-fare riders later

► **CAB Attitude**—While still tagging air coach as experimental, CAB members are generally pleased with the way it has worked out on certificated routes Last week the Board extended from June 30 to Sept 30 the expiration date of Capital's New York-Chicago, New York-Minneapolis, Washington-Chicago, New York-New Orleans and Washington-Minneapolis coach services Northwest's New York-Seattle operation, and TWA's Kansas City-Los Angeles and New York-Chicago coach flights

On the other hand, it decided that Northwest's low-fare Chicago-Portland, Ore., service should not be continued after June 30 because of insufficient traffic CAB is making a continuing study of all coach operations, and unless improvement is shown on one or two other runs they may be dropped this winter

► **Fare, Not Fear**—The federal agency feels that its duty under the Civil Aeronautics Act is to bring air transportation to the masses, not just the well-to-do. It believes that airline patronage is restricted more by fare than by fear

One top Board official told AVIATION WEEK that even if the airlines don't make an additional dollar of profit from air coach, the service can still prove its worth Greater traffic means more equipment and facilities in use, more personnel employed, and a bigger contribution to national defense

Indicative of CAB's willingness to approve promotional tariffs was its recent action extending first-of-the-week family fares for another year—to June 30, 1951 Started by American Airlines late in 1948, the half-fare family plan has been adopted almost universally by scheduled domestic carriers

But the Board eyes suspiciously other attempts to chip away at the fare structure It recently suspended, pending investigation, Pan American Airways' tariffs proposing elimination of the extra charge for berths on Pacific flights It also suspended a Pan American Airways plan to cut Fairbanks, Alaska-Seattle rates and an EAL proposal for Miami-Puerto Rico air coach

► **Cover Charges**—CAB emphasizes that where certificated airline coach revenues fail to cover at least the direct costs of the service, it must be dropped Congress, the Post Office Dept and the railroads would be quick to criticize any increase in airline subsidies resulting from coach operations

Only a sudden slide into deficit operations—such as occurred during 1947 and 1948—would be likely to kill all scheduled coach services Otherwise air coach shows signs of becoming a permanent fixture on the certificated domestic airlines' high-traffic routes

In view of the continued CAB crackdown on nonscheduled operations any early attempt to throw out certificated coach operations would undoubtedly raise a roar of public protest

► **Nonsked Predicament**—CAB now holds the whip hand over the nonskeds as never before Recent court decisions will make it easier to get injunctions against large irregular carriers which violate the law by flying too frequently or regularly A federal court in New York said CAB regulations on the subject are clear—not obscure and subject to misinterpretation, as some nonskeds contended

Further, the Civil Aeronautics Administration is taking action against carriers which make scheduled flights while holding operating certificates permitting only irregular activity

Scheduled Air Coach

Through April, 1950

Carrier	Passengers
Capital	214,358
Eastern	94,741
TWA	93,737*
Northwest	58,838**
National	29,902
Western	21,062
Delta	14,774
American	7,995
Continental	3,115
Mid-Continent	2,779
Total	541,301

* February-March, 1949 figures unavailable

** April-May, 1949 figures unavailable.

Note: Continental and Mid-Continent coach services discontinued. Western totals do not include traffic of Western Air Lines of California which had carried over 100,000 intrastate coach passengers by the end of May 1950

CAB has been irked by nonsked attempts to have congressmen and Alaskan territorial officials "pressure" the Board into a more lenient attitude toward irregulars. Development of scheduled air coach and a continued bad nonsked safety record have strengthened the Board's position. The three-flights per month limit on irregular services between principal U. S. cities (AVIATION WEEK June 12) reflects CAB's increasingly severe attitude.

▶ **Squeeze Continues**—Nonscheduled operators are feeling the squeeze on all sides. Many observers believe the irregulars' plans for protest meetings and war chests to fight the latest CAB crackdowns will bring meager results.

Nonsked traffic on the Pacific Northwest-Alaska and New York-Puerto Rico runs has been declining since the spring of 1949. The large irregulars' transcontinental business—which reached its peak last year—is also waning. A spectacular traffic boom on the New York-Miami run early this year inflated the nonskeds, but it has now fallen off seasonally.

While still handling a substantial traffic volume on the coast-to-coast route, the nonskeds are feeling the competition of 81-passenger Constellation and 70-passenger DC-6 coach services provided by TWA and American Airlines. Both certificated carriers report these coach flights have been running at more than 90 percent capacity during recent weeks.

R. E. S. Deichler, AA's vice president-sales told AVIATION WEEK that coach patronage has exceeded expectations. Extra sections have been added several times, and some July flights have waiting lists. Moreover, American's regular-fare transcontinental business is excellent.

▶ **Rate War Underway**—Both American and TWA charge $110 plus tax on transcontinental coach flights. Until this year, $99 plus tax had been the most frequent nonsked fare on the run, but the bottom has dropped out.

One large irregular now quotes $88 for New York-West Coast flights via DC-4, with a special round-trip rate of $80 each way. On C-46s, it's $75.

But New England Air Express has asked CAB approval of a record-low $59 plus tax coast-to-coast tariff starting July 1. With a little shopping around, a would-be nonsked passenger at La Guardia Field or Newark Airport can make the flight to California for $50.

Some irregulars, hard up for a return load, have hauled passengers for "gasoline money." Ticket agencies have "liquidated" New York-Puerto Rico passengers to carriers for as little as $21 and commissions of up to 45 percent are not uncommon.

▶ **Seasonal Flights Hit**—Certificated airlines are also hurting the nonskeds by taking away their contract and special seasonal business. The irregulars lost contracts to carry thousands of itinerant farm laborers from Puerto Rico to the U. S. when a Westair Transport C-46 crashed in the ocean, killing 28 of the 65 occupants.

Recent CAB orders have helped the scheduled lines capture a much larger share of the summer airlift of fishermen from Seattle to Alaska. Formerly, nonskeds handled the bulk of this traffic.

Parks to Go Ahead Despite CAB Stand

Parks Air Lines last week planned to start operations on a portion of its midwestern feeder routes despite the Civil Aeronautics Board's refusal to sanction the service.

CAB contends that activation of Parks' routes at this time may affect the public interest adversely. The Board noted that it has already heard oral argument in the Parks Investigation Case, which involves the questions of whether the feeder's certificate should be made ineffective and whether the routes should be granted to other companies.

▶ **Illegal Acts Seen**—But Parks' attorneys argue that CAB is using illegal tactics to prevent the service inauguration. They add that Parks is legally entitled to mail pay when operations start.

Parks was awarded its feeder system in 1946 and 1947 but has been unable to begin service because of financial and other difficulties. About two months ago, a CAB examiner recommended that Parks' routes be divided among Turner Airlines, Ozark Air Lines and Mid-Continent Airlines.

Recently, however, C. A. Bachman, president of Twentieth Century Air Lines, a Charlotte, N. C. nonscheduled operator, pledged purchase of several hundred thousand dollars worth of Parks' stock (AVIATION WEEK June 5). California Central Airlines, an intrastate carrier, sold Parks four DC-3s in preparation for opening the new feeder links.

Nonsked Antitrust Suit Dismissed

A Washington, D. C., District Court Judge has dismissed the $1.5-million antitrust suit filed more than a year ago by S.S.W., Inc., Concord, Calif., nonscheduled operator, against 12 certificated airlines, the Air Transport Assn., and the Air Traffic Conference of America.

The judge ruled that S.S.W. must first take its grievances to the Civil Aeronautics Board. Then, if dissatisfied with CAB's action, it may turn to the courts. The District Court decision will be appealed.

S.S.W. had complained that the major airlines, under the guise of experimental operation, have initiated "pseudo coach-fare service" to injure the plaintiff and other independent carriers and drive them out of business. A somewhat similar antitrust suit for $30 million was filed two months ago by Slick Airways against American Airlines, United Air Lines, TWA, the Air Transport Assn. and Air Cargo, Inc. (AVIATION WEEK Apr. 10).

Members Named to ICAO Council

Fourth session of the International Civil Aviation Organization's Assembly, meeting in Montreal, has elected 20 nations to form the second ICAO Council. Named were Argentina, Australia, Belgium, Brazil, Canada, Denmark, Egypt, France, India, Iraq, Ireland, Italy, Mexico, The Netherlands, Philippine Republic, Portugal, Union of South Africa, United Kingdom, United States and Venezuela.

The Council is ICAO's executive body which meets in virtually continuous session in Montreal and is elected for a three-year term. Its duties include adoption of international standards and recommended practices for air navigation and the study of matters affecting the organization and operation of international air transport.

CENTRAL INSPECTS A HILLER Central Airlines, Ft. Worth, Tex., feeder operator, is looking over the helicopter to find a suitable type for its proposed "helimail" service in the Ft. Worth-Dallas area (AVIATION WEEK Apr. 24). First craft to be demonstrated to Central President Keith Kahle (right) and Vice-President Robert E. Harding, Jr., was a Hiller Model 360 powered by a 178-hp. Franklin engine. Central's current fleet of single-engine Beech Bonanzas serves 25 cities in Oklahoma, Texas and Kansas.

Carriers' Safety Records Cited

Thirty-six certificated U. S passenger airlines have won awards for making 1949 probably the safest year in air transportation history

The National Safety Council gave recognition to 35 of these scheduled domestic, territorial and overseas carriers for having neither passenger nor crew fatalities while flying a total of almost six billion passenger miles in 1949 Although it suffered a fatal DC 6 accident at Dallas last Nov 29, American Airlines was also honored for setting a new all time record by flying 4,476,739,000 passenger miles and nearly three years without a fatality

▶ **Gains Continue**—Thus far in 1950, the certificated airlines are maintaining their high safety level There has been only one accident this year—the Northwest Airlines Martin 2-0-2 mishap at Minneapolis, Mar 7, when ten passengers and three crewmen were killed

Last year, 93 passengers died in four accidents on the scheduled domestic airlines—making a fatality rate of 1.3 per 100 million passenger miles flown U. S. overseas flag lines had no fatalities in 1949

During the first five months of 1950, certificated domestic carriers had less than .4 passenger fatalities per 100 million passenger miles And U S flag lines have now gone about 26 months without a fatal mishap

The Safety Council s figures showed that at the end of last year TWA had flown 3 4 billion passenger miles since its last fatal mishap in March, 1947 United had flown 2 1 billion safe passenger miles since its last fatality in June, 1948, and Pan American Airways 2 1 billion safe passenger miles since April, 1948

▶ **Smaller Lines Honored**—Among the smaller carriers, Hawaiian Airlines was cited for flying 20 consecutive years without a fatality Colonial reached the mark in April of this year

Mid-Continent has gone since 1934 without a fatality; Continental since 1935, Chicago and Southern since 1936, and Braniff since 1939

Besides Hawaiian, a long list of certificated carriers have never had a fatal accident Included are Inland, Northeast, Caribbean-Atlantic, all the feeder-lines, and six Alaskan carriers—Cordova, Ellis, Northern Consolidated, Pacific Northern, Reeve Aleutian and Wien Alaska

CAB Hits Illegal Freight Practices

The Civil Aeronautics Board has taken action against two domestic and four foreign airlines accused of illegal airfreight practices

Air France, Sabena, KLM and Scandinavian Airlines System did not admit the truth of CAB's rate-cutting charges against them But, to avoid lengthy proceedings, they agreed to accept Board orders requiring them to cease and desist from charging less or different cargo rates from those listed in their trans Atlantic tariffs, and to stop refunding, directly or indirectly, a portion of the rates to the shippers

Meanwhile, American Airlines and Northwest Airlines agreed to cease and desist from alleged unfair methods of competition in soliciting freight (AVIATION WEEK Feb 13) CAB's charges against American involved alleged illegal deals with freight consolidators in the San Francisco and Los Angeles areas Northwest was said to have violated the Board's economic regulations in its transactions with Fly Freight, Inc , a New York cartage and contract motor carrier, and Sterling Freightways, a Minneapolis trucking concern

TURNING THE TABLES

Jerome Lederer (left), one of the nation's leading air safety experts who has instigated many awards for safety on the part of others, is rewarded for his own work with this cup presented by Sigmund Janas, president of Colonial Airlines which has completed 20 years of non-fatal operation Lederer, who has been promoting safety since the mid twenties, is now President of Flight Safety Foundation and technical adviser to United States Aviation Underwriters.

Airfreight Fair

An airfreight fair at Oakland Municipal Airport will highlight the second day of the California Air Freight Clinic, Aug 19-20 The fair will feature demonstrations of cargo aircraft, packaging, handling, tie down and temperature control equipment, airflown products and other displays pointing up the advantages of shipping by air

SHORTLINES

▶ **American Flyers, Inc**—Has become the third large irregular carrier to obtain an individual operating exemption from CAB The Board said the Ft Worth nonsked had a clean safety record and had not violated economic regulations by operating too frequently between the same points in the past Company owns four DC-3s and a Lockheed It made a total of 137 flights in 1948, 85 in 1949 and 20 in first quarter 1950

▶ **BOAC**—Reports the prototype turboprop Vickers Viscount is completing a series of tropical test flights in Africa after a recent successful demonstration tour of Western Europe and Scandinavia. British European Airways plans to buy 25 Viscounts for middle-distance European routes, and BOAC intends to order 12 of the four-engine, 40-passenger ships for use by its subsidiary, British West Indian Airways

▶ **Bahamas Airways**—CAB has authorized the British carrier to serve West End, Grand Bahama Island, as a coterminal with Nassau on its route to Miami and Palm Beach, Fla

▶ **Capital**—Expects to put the first of five Constellations in service on the Washington-Chicago link about the third week in July Four more Connies will be available for this and other routes by the end of August First Super DC-3 is to be placed on the Norfolk-Memphis run late next month, and the final two on order will be ready in August

► **Colonial**—Canadian Air Transport Board has dismissed the order issued last December requiring the carrier to show cause why its Canadian operating license should not be suspended. The Dominion's original move stemmed from Colonial's legal action to prevent Trans-Canada Air Lines from starting competitive Montreal-New York service.

New low roundtrip rates have boosted Colonial's Bermuda traffic 85 percent.

► **Continental**—Has asked CAB for a new link between Tulsa and Kansas City via Bartlesville, Okla.

► **Flying Tiger Line**—Has signed an interline freight agreement with Capital Airlines.

► **KLM**—Trans Atlantic all-cargo flights have been increased from one to two weekly.

► **Lineas Aereas Nacionales**—The Colombian carrier has bought two DC-4s from the Argentine airline, FAMA, and is planning to purchase two more.

► **Miami**—Says its International Airport handled 134,263 international passengers, or 48 percent of the U. S. total, in first-quarter 1950, compared with 71,628 (25.7 percent) for New York and 10,657 (3.8 percent) for New Orleans.

► **Mid-West Airlines**—CAB has instituted an investigation to determine whether the lightplane feeder operator is violating the Civil Aeronautics Act by failing to maintain minimum pay scales for its pilots. The Board's move followed a complaint by the Air Line Pilots Assn. Mid West previously had asked for a special exemption to pay pilots of its single-engine Cessna 190s less than the legal minimum wage (AVIATION WEEK May 15).

► **Pan American**—Will inaugurate twice-weekly Stratocruiser service between New York and Buenos Aires on July 5. The deluxe, extra fare flights will cut present scheduled time almost 30 percent. PAA says increased utilization of the double-decked Boeings on Atlantic and Pacific routes permits their introduction on the South American run.

► **Scandinavian Countries**—Reportedly have increased maximum takeoff weight for DC 3s from 26,200 lb. to 28,000 lb. The British have used the higher limit since the war. U. S. carriers have a 25,200 lb. maximum for passenger DC-3s and 26,900 lb. maximum for cargo DC-3s.

► **Southern Airways**—Completed its first year of certificated feeder service on June 10.

► **Swissair**—Swiss Cabinet is reported considering a state subsidy for the carrier, which lost about $1,120,000 last year. Credit of $3,360,000 to buy two modern long-range aircraft is being studied by Parliament.

► **Trans-Canada**—Officials have indicated TCA may wait until the end of next year before deciding whether to buy jet transports.

► **TWA**—Flew 4,040,000 domestic passenger miles on June 11 to chalk up the highest single day's traffic in its 20 years of transcontinental service. During the first 12 days of June, TWA's domestic traffic was 8.6 percent ahead of last year.

► **Turner Airlines**—Flew 1150 passengers in May, up 31 percent over April.

► **United**—May passenger mileage gained more than 6 percent over last year. Freight rose 35 percent, mail 16 percent and express 42 percent.

► **U. S. Aircoach**—CAB has denied the nonskeds application for an exemption to operate group charter passenger flights from the U. S. West Coast to Hawaii, the Philippines, Okinawa, Japan, Formosa, Australia and New Zealand.

CAB SCHEDULE

June 26—Oral argument in Western Island mail rate case. (Docket 2870 et al)

June 26—Hearing in Florida-Bahamas service case. (Docket 2324 et al)

June 29—Oral argument on applications of Colonial Airlines and American Airlines for service to Toronto. (Docket 2853 and 4032)

July 10—Resumption of hearing in Colonial Airlines mail rate case. (Docket 2724)

July 25—Resumption of hearing on renewal of Southwest Airways (feeder certificate and service suspension at certain United Air Lines points in the area. (Docket 3718 et al)

July 26—Resumption of hearing on renewal of West Coast Airlines feeder certificate and service suspension at certain United Air Lines points in the area. (Docket 3966 et al)

July 31—Hearing on Lehman Brothers' interlocking relationships case involving partners of firm holding airline directorships. Postponed from July 17. (Docket 3605 et al)

Aug. 7—Hearing in reopened case on additional California-Nevada service. (Docket 2618 et al)

Sept. 18—Hearing on renewal of Frontier Airlines feeder certificate and service suspension at two United Air Lines stops in the area. (Docket 4348)

Sept. 26—Hearing on Mid-Continent Airlines application to have its Route 80 certificate (Tulsa-Houston) made permanent. (Docket 3692)

Oct. 16—Hearing on Los Angeles Airways application for renewal of its helicopter mail-cargo certificate and for additional authority to carry passengers. (Docket 3800)

Jan. 8, 1951—Hearing in Big Four mail rate case and CAB investigation of the carriers' economy and efficiency. (Docket 2949 et al)

LETTERS

Fairchild's Lark

I'd like you to know how pleased the Fairchild people were with the article by David Anderton on Fairchild's Lark Project (May 22). In fact, they like it so much that they have asked me to get 250 reprints.

Thanks for a job well done

PAUL GAYNOR,
J. M. Hickerson Inc., Advertising
110 East 42nd St., New York, N. Y.

You May 22 issue carried an article by David A. Anderton, "Lark Production Shows Missile Progress." It credits design and configuration to Fairchild personnel.

The design credit for this should go to the Bureau of Aeronautics engineering personnel Ivan Driggs, Ab Hyatt and Don Baker who evolved the configuration based on the kinematics of the homing problem as analyzed by myself and engineers under my direction.

M. V. KIEBERT, JR., Manager
Telemetering Division
Raymond Rosen Engineering Prod., Inc.
32nd & Walnut Sts., Philadelphia 4, Pa.

(Aircraft—and missile—designs are the end products of many minds and many hands. The "back of the envelope," one-man approach just does not exist any more. Contributions to the Lark program and basic configuration have been many, and Fairchild is proud of its association with BuAer, Raymond Rosen, Reaction Motors and others. But experience has shown that the original configuration of an aircraft, used to analyze performance, is generally too theoretical to be built. It is smaller, lighter and cleaner than the final airplane. And so it has often been with missiles. A basic configuration may need anything from geometric enlargement to complete redesign before it can be reasonably produced. Fairchild recognizes that the Lark is an achievement where much credit is due to many people. Undoubtedly Driggs, Hyatt and Baker contributed greatly to the design of the Lark during its preliminary phases. Fairchild took over from there and "developed" the current production missile.—Ed.)

A. W.'s Fellowship

I am glad to see the editorial announcing the Aviation Week Fellowship at M.I.T. It should stimulate some of those who have profited from aeronautical science to follow your good example. I think you are wise to emphasize the need for advanced study.

I sent your editorial to the President.

J. C. HUNSAKER, Professor in Charge
Department of Aeronautical Engineering
M.I.T., Cambridge 39, Mass.

I have read with interest the advance copy of your editorial on the Aviation Week Fellowship in Aeronautical Engineering, and I think this is a splendid presentation. I hope with you that others will follow your example.

JOHN W. M. BUNKER, Dean
The Graduate School
M.I.T., Cambridge 39, Mass.

STRICTLY PERSONAL

THE FLYING PIPPINS—Dr B I Pippin, an M D at the Pippin Clinic in Richland Center, Wis, refers to our squib here about Earl Osborn's 11th plane in 27 years Doc says, 'Please inform Earl Osborn that in 25 years I have owned 17 planes, all new except the Standard Jenny and AT 6, plus a glider On Osborn's Edo floats with extra gas in the mid-section and a wobble pump, I have fished every spot from Lake o' the Woods to Gods Lake and Hudson Bay I have strapped a 200 lb buck in the front seat of a Cub and flown him home from the North Woods Come on, Boys, top this! It's too dangerous to drive a car these days'

(The Pippin Clinic's letterhead shows three M D pilots and a D D S student pilot on the staff)

* * *

BITS ABOUT PEOPLE

Old Timer **Roger Q Williams** now lives at 1265 Manuel Court, Oakland, Calif, and why don't some of his old friends write to congratulate him on his book 'The Moon and Half Way Back'

We were glad to see **Lester Gardner** at the Brooklyn Polytechnic dinner for **LeRoy Grumman** the other night at New York's University Club He is recovering slowly from the after-effects of an operation He lives at 251 West 101st St, NYC The dinner preceded the school's award of an honorary degree to Grumman Aircraft Engineering's chief

* * *

"CLEAVAGE BETWEEN TWO LADIES"—Correspondent **Jerry Lederer** reports after a "survey trip" to Bermuda that briefing officers who lecture passengers on sea survival on Colonial Airlines' over water trips no longer refer to life jackets as Mae Wests Wishing to stay abreast of current developments they now refer to them as Jane Russells

* * *

DR VON FLUGEN'S AVIATION GLOSSARY

(Continued)

CLUSTER JOINT A crowded establishment
COMMERCIAL BRASS Persons of high authority
COMPENSATING THE COMPASS A ritual performed by pilots and navigators after emerging from a heavy cloud formation
CONTRA-ROTATING PROPELLERS The act of turning a propeller in the opposite direction at the same time
DETAIL ASSEMBLY The aft portion of an airplane
DIE CASTING A form of gambling
DZUS An ancient Greek God.
ELASTIC CENTER Having a hard resilient center as a golf ball
FACTOR OF SAFETY An ideological illusion to the fact that safety should be considered in designing airplanes
FAHRENHEIT A system of measuring vertical distance above the earth's surface One Fahren equals 0.53959 nautical miles
FARAD A high official in the Egyptian government
FITTING FACTOR A process utilized in structural analysis whereby a factor is manipulated so as to fit the particular airworthiness requirement
GALVANIZED IRON Iron which has been rapidly set into motion
GAMMA RAYS A fraternity basketball team noted for their infiltration tactics
GANG DRILL A military reserve unit training procedure
GERMAN SILVER A type of silver containing any metal except silver
GLIDING DISTANCE One-half of the vertical distance from an airplane to the nearest landing area at the time of complete power failure
GUSSET A light gust.

(To be continued)

* * *

TRUE CONFESSION FROM McCANN-ERICKSON—The microscopic scrutiny our readers give this magazine is always scaring our staff The other day a reader called up to say did we know that the Ford tri-motor Standard Oil pictured in their ad last Feb 20 wasn't really a 1927 model as it was labeled? It was, our reader claimed, a later Ford We wrote McCann-Erickson, Esso's advertising agency, and comes this reply from **George W Sefton**, account executive:

"Your reader is right The plane pictured is actually the Stanolind II which succeeded the 1927 model Stanolind I, also a Ford tri-motor We were forced to use the later model in the illustration because no pictures of the Stanolind I were reproducible We retouched the photo somewhat, hoping to escape detection Your Sherlock Holmes reader has spoiled our perfect crime You may rest assured, however, that Standard Oil Co of Indiana WAS operating a Ford tri-motor in 1927, And it was almost like the one shown in our ad"

R H W

WHAT'S NEW

New Quarters

The New York branch office of the International Air Transport Assn has been moved to Room 2134, 165 Broadway, New York 6, and its telephone number now is WOrth 4-4637 Rudolph Feick is secretary of the branch office William D Barrington is in charge of the rates and tariffs office

U S Airlines, Inc, has relocated its New York office at 516 Fifth Ave; the telephone number is MUrray Hill 2-3809 The air freight carrier has opened a Philadelphia office at 100 S. Broad St Phone number is LOcust 7-1817

Herbert A Bornemann, former U S. Airlines sales rep in N Y has been appointed regional sales manager in charge of the Philadelphia office

American Screw Co has moved all administrative, engineering, production, purchasing, sales and research function and personnel from Providence, R I, to a new location at Willimantic, Conn. The company had been in Providence for 112 years

Agency Notes

Frank R Brine, formerly advertising manager for The Babb Co, Inc, has opened his own agency to service general and industrial accounts Named Frank R Brine, Advertising, the agency will have temporary quarters at 1227 Ave of the Americas N Y, until July 15 when it will move to 444 Madison Ave.

United Control Corp, maker of aircraft electronic control equipment, has appointed West-Marquis, Inc, Seattle, as its advertising agency Welles R Wiley, will handle the United Control's account

Charles G "Chuck" Fredericks, well-known instructor and airline pilot, has joined the Crone Air Travel Service of New York, reorganized as Crone-Fredericks Travel Service, Inc, located at 500 Fifth Ave

New Literature

Delbridge Combined Social Security and Withholding Tax Chart covers the new, government-approved, simplified payroll tax deduction system, claimed to afford greater time savings and simpler procedures than those practiced heretofore

Price for weekly payroll period book is $7 50, for monthly payroll period $10 Published by Delbridge Calculating Systems, Inc, 2502-10 Sutton Ave, St Louis 17, Mo

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—JUNE 26, 1950

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PROFESSIONAL SERVICES—
First issue of each month

■

SEARCHLIGHT SECTION
(Classified Advertising)

EDITORIAL

Pullman's Vicious Ad

Pullman's advertisement appearing nationally hits an all time low in competitive selling. We can remember no other instance when a so-called reputable company stooped to imply its competitors will kill you and so leave your wife a widow and your children fatherless.

The use of the death or injury threat as a selling point over Pullman's competitors is beyond belief—but there it is.

The ad itself is inherently dishonest. Textually, the three reasons this mythical man has for going Pullman are in small type at the bottom (safe—underlined). Pictorially, the three reasons are wife and two children.

While this ad strikes viciously at all other competitors of the railroads, it obviously is intended to hit at the airlines hardest. There's a reason.

Pullman is losing more business to air carriers than to any other competing group. In 1949 the airlines claimed 41.63 percent of the total first class scheduled travel market (air and Pullman). This was a new high for air. In 1948 it was 35.30 percent, and in 1940 it was only 12.36 percent. Air is coming up, and FAST. Pullman is worried.

Pullman obviously must feel that its most powerful argument with the public against the airlines is safety. It knows that safety traditionally has been a major customer-relations problem of the airlines, although it is not nearly as serious as it was several years ago. And while statistics prove the airlines are nearly twice as safe as they were only nine years ago, for example, the domestic airlines' safety record is still not quite as high as the Pullman rate. But it is better than the auto rate. And it's a fraud to insinuate that passengers can't get killed in Pullmans.

Incidentally, U. S. flag international airlines hung up a safety record in 1949 that not even Pullman could exceed. No deaths.

However, we are unwilling to lay all the blame for this ad on Pullman. Because many an advertiser's pet suggestion for copy themes has been promptly scotched by reputable advertising agencies who not only know all the various fair trade codes in their business, but make some effort to live up to them.

Pullman's agency in this case was a firm called Young & Rubicam. Up to now this outfit has rated a good enough reputation, as far as we can learn. We doubt if it will carry a very savory name in Aviation from here on. Because this ad is in exceedingly bad taste. It is unethical, misleading, disparaging, dishonest, destructive, deceptive and unfair. And all of the advertising associations we know of have disavowed all of these shortcomings, specifically.

These groups include the Association of Better Business Bureaus, Inc., the American Association of Advertising Agencies ("avoid false statements or misleading exaggerations"), the Advertising Federation of America and the Newspaper Advertising Executives Assn., Inc.

The U. S. Supreme Court said in a decision Mar. 3, 1948, "Advertising must be written for the probable

effect it produces on ordinary and trusting minds, as well as for those intellectually capable of penetrating analysis."

Strangely enough, none of the codes specifically deplores using the threat of death or bodily injury for persons who use products or services competing with the advertiser's business. It probably never occurred to any of these highly respected groups that anyone would be so lacking in ethics or taste to attempt it.

According to our latest Agency List of the Standard Advertising Register, Young & Rubicam has such other accounts as Borden's food products, Bristol Myers tooth powder and headache drugs, Sterling Drugs, Drake and Purity Bakeries, Johnson & Johnson baby products and surgical dressings, and Lever Bros. Soaps. All of these products are intimately related to public health and safety. We wonder in how many of these firms' ads would Young & Rubicam dare to introduce a mythical character who insinuates death or injury for you if you use competing products?

We think Pullman and this agency have put over a gross misrepresentation on national magazines and the public. Our only consolation is that we find no air transportation or aviation accounts on this agency's list.

No ad copy the airlines have ever run in the recent and current advertising battle between air and rails has come close to this ad in misrepresentation and bad taste. But what copy could?

—Robert H. Wood

Behind the scenes on the B-47

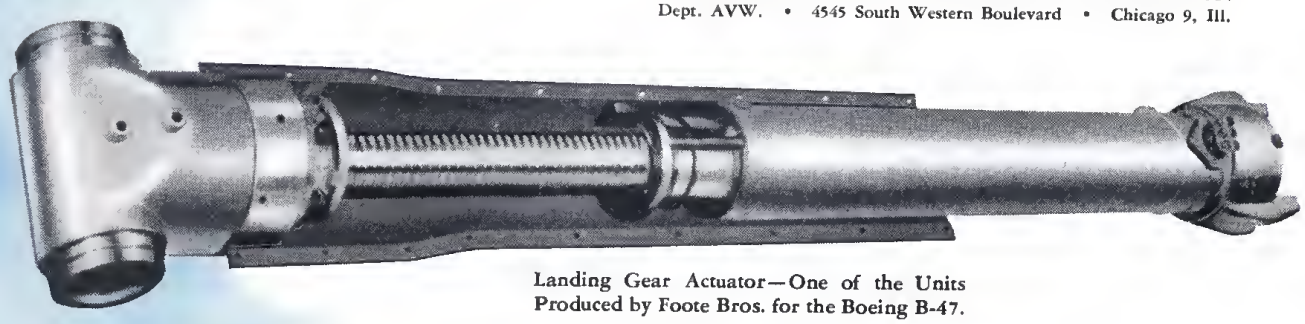
Here is the Boeing B-47—the sleek jet-propelled bomber that eats up distance at a rate of more than 10 miles per minute.

Operating such a swift air giant demands a range of controls that must represent the last word in quality.

Boeing looks to Foote Bros. for the production of actuators and power units which are aiding in the amazing performance of this master of the skies.

On many of America's leading aircraft and aircraft engines, you will find equipment manufactured by Foote Bros. —chosen because of the years of experience of this company in producing gears and actuators light in weight, achieving new extremes in accuracy, capable of traveling at high speed, designed to fit a confined space envelope.

FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. AVW. • 4545 South Western Boulevard • Chicago 9, Ill.



Landing Gear Actuator—One of the Units Produced by Foote Bros. for the Boeing B-47.

FOOTE BROS.

Better Power Transmission Through Better Gears